# DETROIT
AND
# WORLD-TRADE

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# DETROIT
AND
# WORLD-TRADE

A survey of
the City's present and potential
Foreign Trade and Seaboard Traffic, and the
facilities therefor, with special reference
to the Proposed St. Lawrence
Deep Waterway to
the Sea

Published by
The Detroit Board of Commerce

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By
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Compilations by
Frank Howard Evans
Statistician

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John A. Russell, vice president of the Detroit Board of Commerce, and editor of the Michigan Manufacturer & Financial Record, directed the presentation of evidence at the Detroit hearing, October 22, 23 and 25, 1920, before the International Joint Commission, on the proposed Great Lakes-St. Lawrence deep waterway to the sea, in connection with which this volume was written.

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# FOREWORD

In the succeeding chapters of this small volume an attempt will be made to outline a picture, as complete as possible within certain limits, of the industrial and commercial development of Detroit and contiguous territory from the earliest days to the present, with particular reference to the part played in such development by transportation facilities. Indeed, the basic economic law which will govern every consideration may be summed up in the phrase, "transportation governs production," whether that production be industrial, agricultural or some other kind.

Of course it will be unnecessary to do more than touch upon the early history of this development, and it will be done only that we may have an historical basis upon which to forecast future developments. A majority of the statistics which will be offered, after those included in the brief historical sketch, will cover industrial and commercial activities during 1919, which was the period of transition from war to peace conditions, so far as peace conditions can be said to have returned. It is believed, however, that these figures will give a fair idea of general conditions as they will exist for some time to come, and will serve, together with the historical data, as a firm foundation in forecasting conditions still farther in the future.

As the chief purpose of this volume will be to provide in printed form a brief of Detroit's case in support of the proposed Great Lakes-St. Lawrence deep waterway to the sea, for presentation to the International Joint Commis-

sion, everything that it contains will have special reference to the waterway. This does not mean that an attempt will be made to fit the facts to a theory that such a waterway is feasible and desirable. It does mean that an attempt will be made to show that the facts point directly to the feasibility and desirability of such a waterway when considered in the absence of any *a priori* conclusion. The engineering phases of the subject will be ignored, as Detroit is called upon to show only the economic value to the city of the proposed waterway.

A brief consideration of the subject will indicate that the chief benefit to Detroit and Detroit's hinterland which would accure from the proposed Lakes-to-Ocean route would be the establishment of Detroit as an ocean port, thus opening the way for direct export and import business with all ports of the world and for all-water shipments to and from the Atlantic seaboard and the Gulf ports, and the Pacific seaboard via the Panama canal. Consequently, the largest part of the data to be educed will concern exports, imports and trade with the seaboards. Detroit will be considered both as the point of origin for tonnage and as the gateway for tonnage originating in the hinterland. The city will also be considered as the destination for imports and seaboard shipments, and as the gateway for such shipments destined for hinterland points.

To sum up then what has been written:

An attempt will be made to picture Detroit as an industrial, commercial and transportation center, for the purpose of showing the vital need that exists, and that

will exist in even greater degree in future, for better transportation facilities, and consequently the extreme desirability and feasibility from an economic standpoint of the proposed Great Lakes-St. Lawrence deep waterway to the sea. It will be shown what new production, now restricted, will be made possible; what resources, now latent, may be developed, and what traffic, now strangled, will be relieved.

So far as known, the special kind of industrial survey upon which this volume is based was the first ever attempted in the Detroit industrial district and the state of Michigan. Consequently it was necessary to educate the business interests involved to the point of disclosing information hitherto held confidential. Indeed, much information that would have been desirable proved unavailable, because manufacturers and business men believed it unimportant and had either not segregated the figures required from their general accounts or had failed entirely to keep any such records. It will be necessary, in order to safeguard the interests of individual firms, to present statistics classified by industrial and commercial groups rather than by individual companies.

Before proceeding, full credit should be given to those persons, organizations and records from which material was obtained for use in the chapters that follow. These include the following:

Capt. William H. Adams, Consulting Engineer, chairman of the Inland Waterways Committee of the Detroit Board of Commerce, R. J. MacLean, vice-chairman, Inland Waterways Committee, Detroit Board of Commerce,

Dr. R. S. MacElwee, director of the United States Bureau of Foreign and Domestic Commerce, C. C. West, President Manitowoc Shipbuilding Company, Chas. P. Craig, executive director Great Lakes-St. Lawrence Tidewater Association, John A. Russell, editor Michigan Manufacturer & Financial Record, Judge J. P. Weissenhagen, foreign trade department University of Detroit, the manufacturers, wholesalers and larger retailers of Detroit, commercial club secretaries and manufacturers throughout southern Michigan, annual report of the Lake Carriers' Association for 1919, custom house reports and other United States government statistics, Canadian Department of Customs, Canadian Naval Survey, Detroit Public Library, Burton Historical Collection, Parkins' Historical Geography, Board of Commerce branch of the Detroit Public Library and the statistical, industrial and transportation bureaus of the Detroit Board of Commerce.

# CHAPTER I

Navigation by white men of the waterways comprising the St. Lawrence system began long before de la Mothe Cadillac and his little fleet of about two dozen canoes, bearing Frenchmen and Indians, entered the Detroit River on a mission that was to introduce civilization into the Great Lakes region nearly one hundred years in advance of the British-American progress westward from the Atlantic seaboard. As early as 1629, the south shore of Lake Superior, as far west as the Apostle Islands, had been visited, and by 1670 French explorers, traders and missionaries had navigated all of the Great Lakes and knew all of the portages within the St. Lawrence basin.

## Founding of Detroit

Early in June, 1701, the little party headed by Cadillac, who had come to plant an outpost of French power and influence in the wilderness about the Great Lakes, left the head of the La Chine Rapids, near Montreal. Fearing the hostile Iroquois, they chose the northern route, toiling up the swift currents of the Ottawa and passing thence by lakes and rivers, with many portages, to Georgian Bay and later to Lake Huron. Forty-nine days after their departure from Montreal, they entered "the Straits"—"d'Etroit" in the language of the French. Down these they swept, passing many islands, and down the St. Clair River, crossed Lake St. Clair and descended the upper reaches of the Detroit River.

On July 24, 1701, they selected a commanding site on the right bank of the river and there founded the post which was to become the chief distributing point for the early commerce of the West. For more than one hundred years after its founding, Detroit, or Fort Pontchartrain as Cadillac named it, remained the most important military and trading station on the Great Lakes.

## Early History of Detroit

There are few other cities in America that have taken for so long such a prominent part in the history and development of the section in which they are situated. During the long struggle for supremacy in America between the French and British, Detroit became, on account of its strategic location, the objective in many important campaigns. Later, as the seat of British power in the West, the community was frequently called upon to withstand the attacks of Indians. It was not until after the war of 1812, when at last Detroit became an integral part of the United States, that the village came to be considered more than a military and trading post. For more than a century its growth had been retarded and its very existence made precarious by continuous warfare.

## Development of City Begins

The real development of the community began immediately after the war of 1812. Since then, few cities have enjoyed such a steady and rapid growth. In 1830, Detroit was the fifty-third city in size among American municipalities, in 1910 Detroit stood ninth, and today it stands in fourth place. The present rapid increases in population, building construction, commerce and industry indicate that it has not yet reached its final rank among the cities of America.

Manufacturing industries, as distinguished from household industries, commonly come late in the economic development of any region. The hunter and trapper comes first and is followed by the pioneer settler, who is half hunter and half farmer. The pioneer is soon replaced by the real agriculturist. With further increases in population, a village is finally started, which with favorable conditions may become a town, and later a city. Such growth depends largely upon transportation faci-

The Walk-in-the-Water was the first steamer to operate on the Great Lakes and Detroit was the western terminus for most of its voyages.

lities. With each improvement in the carrying agent comes a corresponding increase in production of all kinds, as new sources of material are tapped and a wider range of markets is made available.

### Early Water Transportation

For nearly a century, the birchbark canoe was the only means of conveyance for men and goods on the Upper Lakes. The only exception to this was the fleet of barges that Cadillac caused to be constructed, soon after the settlement of Detroit, for use in the fur trade on the larger lakes and rivers. In 1705, it is recorded, Cadillac had built a 10-ton sloop, and thereafter more sailing vessels were constructed by both French and British during the struggle for trade supremacy on the Great Lakes. In 1818, the first steam vessel, called the Walk-in-the-Water, had its advent on the Great Lakes, making Detroit the western terminus for most of its voyages from Buffalo. Since 1818 the development of steam navigation on the Great Lakes has continued rapidly until it has reached its present status.

With the advent of sailing vessels on the Great Lakes and the increasing demand for more and larger vessels, shipyards sprang up at Detroit, and shipbuilding became an important factor in the growth and prosperity of the community. The city still continues to hold its place among the more important shipbuilding centers of the country.

### Early Land Transportation

Overland transportation in Michigan was long neglected, and it was not until the opening of the war of 1812 that the first road in the state was constructed. General Hull caused it to be built for the purpose of bringing military supplies and food from Toledo to Detroit.

This road was poorly made and inadequate, and consequently was little used after the war, until in 1820 the first stage line between Detroit and Ohio was established. About this time settlers began to push inland from Detroit, and in 1825 several Michigan roads were projected. By 1835 roads were completed to Chicago and to Flint, Michigan, while others, little more than trails, extended to other points in the southern half of the Lower Peninsula. In 1836, the first stretch of railroad was constructed in the state by the Detroit & St. Joseph Railroad Company, and by 1849 this railroad reached Lake Michigan. Since then, development of Michigan railroads has continued steadily until the present.

### Beginning of Industry

The primitive character of Detroit's industries during the first decade of the nineteenth century is well shown by the following data, covering one year's production:

| PRODUCTS | AMOUNT | VALUE |
|---|---|---|
| Flax and hemp goods—yards | 421 | $ 316 |
| Woolen goods—yards | 1,300 | 1,300 |
| Hats—number | 400 | 2,800 |
| Liquors—gallons | 8,200 | 6,000 |
| Soap—pounds | 57,000 | 4,750 |
| Candles—pounds | 6,500 | 2,356 |
| Hides, tanned—number | 1,100 | 6,600 |
| Saddles and bridles—number | 60 | 720 |

The spinning was done almost entirely in the homes, while two tanneries, a hat factory, two distilleries, four soap factories and four grist mills stood on the sites that today are occupied by some of the plants which are the marvel of the industrial world. These small industries supplied only the local demand.

The second decade of the century saw little industrial progress, for the great abundance of cheap land, all of great productivity, tempted the settlers to agricultural pursuits. So this period witnessed a reversal of present

day labor conditions. A working man with a very modest capital could procure, and by good management successfully cultivate, 100 acres of land, and consequently the laborer sought the country as soon as he had accumulated a few hundred dollars.

### Exportations Begin

Completion of the Erie Canal, together with some railroad building, during the next two decades brought improved living conditions and an influx of skilled labor. Industries flourished and available figures for 1840 show that, while the products of grist and saw mills still held the lead in importance, gains were made in manufactures of metal products, notably machinery. At this time also was begun the manufacture of carriages and wagons, which later developed into the leading industry of the district. The tanning of leather, owing to the quantities of oak bark in the vicinity, still played an important part. The value of the leather output increased from $1,100 in 1810 to $81,000 in 1840. During this period the milling of flour increased beyond the needs of the community, and seeking a market, this product found its way east through the newly completed Erie Canal.

By 1840, a growing trade with the West Indies had been established through Montreal merchants, and record exists of 180,000 barrels of flour, exported from Detroit through the St. Lawrence waterway.

### Metal Industries Take Lead

The next twenty years were marked chiefly by increasing transportation facilities, both to the East and West. During the latter part of the period, the completion of St. Mary's Canal (1855) stimulated the metal industries by providing an outlet for iron and copper ores from the Upper Peninsula ranges.

Agricultural implements were in great demand, and records for 1860 show a large variety of such articles being manufactured. The refining of metals had superseded all other industries in importance. Copper smelting, with seven establishments, and an output of $1,500,000 worth of ingots, outranked the iron industries, but the rapid increase in population throughout the upper lake regions later induced copper manufacturers to move nearer the mines. It was not until 20 years later, however, that this industry dwindled to an unimportant place.

Except for the extraordinary activity in the copper trade, reports for this period, about 1860, show no more than a normal increase over the preceding one. There were now 163 manufacturing concerns, employing more than 2,000 men, and 13 kinds of products, with valuations of $1,000,000 or more, were listed. The community had become a city of 45,000 population, and its position as a manufacturing center was definitely established.

## New Transportation Era Opens

The year 1860 marked the beginning of a new era in transportation. The screw propeller had come into use, which permitted the design of steam craft with machinery situated aft, leaving the vessel's hold unobstructed for cargo space. Steel had not yet become a factor in hull construction, but by 1875 there were registered 16 iron vessels, with an aggregate tonnage of 15,585.

Railroad lines were being rapidly constructed. The Michigan Central had completed connections by rail with Chicago. The Great Western Railroad had been completed from Niagara Falls to Windsor, Ont., and Detroit now had year round communication with the eastern seaboard. Three other lines westward from Detroit were in various stages of construction.

The Michigan Central Terminal at Detroit just prior to the Civil War.

### Traffic Routes Change

The opening of the rail route from the Middle West to the eastern seaboard was the determining factor in shifting the trend of traffic from Mississippi routes, and in consequence, New Orleans lost the dominating position held up to this time. Detroit's position at the break in transportation occasioned by the Detroit River played an important part in the city's development. In 1867 car ferry service was established and continued to carry the bulk of traffic until the building of the Detroit River tunnel in 1910. Wagon roads were extended as mileage increased, and an ever widening area poured its wealth into Detroit. Reports for 1850 give the total railroad mileage radiating from the city as 779, which by 1870 had increased to 1,638.

The increase of transportation facilities was reflected in increased investment of capital by manufacturers. Totals for 1860 were something over $4,000,000 while the records for 1870 show nearly $15,000,000.

### Nature of Products Changes

The nature of the manufactured products had undergone a marked change by 1870, and during the next decade underwent still further changes. Copper no longer figured as a leader, having been displaced by the foundry and machine shop products of iron and steel. Several products which 20 years before had either not been listed or occupied minor places, were now contending with the leaders. Among these the manufactures of tobacco and cigars showed the greatest advance. The output of these tobacco factories in 1860 was valued at $6,000, but in 1880 there were 63 establishments, employing more than 1,000 persons, and with an annual production worth nearly $2,500,000. Excellent facilities for distribution, and the

large market offered at home, appear to have been the reasons for the remarkable growth in this industry.

## Production Grows Enormously

The United States census report of 1880 gave for the first time an accurate survey of Detroit's industries. The leading products for that year were tabulated as follows:

| PRODUCT | VALUE |
|---|---|
| Iron and steel | $2,499,000 |
| Tobacco and cigars | 2,409,000 |
| Men's clothing | 2,056,200 |
| Foundry and machine shop products | 1,808,000 |
| Meat products | 1,721,000 |
| Flour and other cereal products | 1,650,000 |
| Malt liquors | 1,144,000 |
| Boots and shoes | 1,065,000 |
| Printing and publishing | 986,000 |
| Bread and baking | 930,000 |
| Shipbuilding | 739,000 |

The total of all products was more than $30,000,000, representing about 20 per cent of the entire production of the State of Michigan. This put Detroit in nineteenth place among the cities of the country in point of manufactures. It stood seventeenth in population, with a total of 116,340.

## Railroads Become Factor

Up to this period, 1860-1870, the growth of Detroit's industries had been dependent upon and concurrent with the increase in means of transportation. Each increase in the facilities for rail and water had given impetus to manufacturing. Now the city was no longer dependent upon the surrounding region for raw materials, nor were the markets for finished products limited in extent. This period saw the most extensive building in the history of the railroads in America. Ten roads now led from Detroit, and direct communication with Chicago, by way of the Michigan Central, gave Detroit access to the vast terri-

tory reached by the network of rails that focussed at the city on the south shore of Lake Michigan. And yet Detroit's manufactures kept stride.

### Furniture Industry

The early history of the city's industries had been closely identified with the raw materials at hand. The proximity of vast supplies of hard woods, of beautiful grain and texture, gave rise to the manufacture of furniture, an industry for which Detroit gained a world-wide reputation. There are said to have been more than 50 varieties of hard woods in the lower forest belt. The furniture industry in Grand Rapids had its inception only a little later than in Detroit, beginning to assume a real importance just prior to 1850. Since then, this industry in Detroit has been far outstripped by a dozen others, while Grand Rapids has become the greatest furniture producing city in the world, a position which it continues to hold despite the fact that most of the hard wood in the Lower Peninsula has long since gone.

### Vehicle and Motor Industries

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Improvement of Michigan roads caused a great demand for vehicles, and again the forests yielded the hickory, ash and oak for their construction. From the start this industry was an extensive and profitable one. Whole communities at one time or another were devoted almost exclusively to the manufacture of carriages and wagons. Then, too, the numerous lakes and rivers in this region made the manufacture of small craft, equipped with small engines, a natural and growing industry, which later, with the invention and improvement of internal combus-

tion engines, developed into the extensive marine motor industry, which in turn played an important part in the early development of the automobile.

The year 1890 found Detroit a prosperous and growing city of 200,000 population, with a well earned and wide reputation as a manufacturing center. Its industries were firmly established and were the logical outgrowth of their location and environment. The working men were skilled and the manufactures of so diverse a nature that the city's welfare was not dependent upon the fortunes of any single industry.

### Stove Industry

Among the industries of the period, the production, founding and fabricating of iron and steel still maintained its place in the lead. It is asserted that what is now known as Bessemer steel was first produced in Detroit during the decade antedating 1870 by Eber B. Ward, who used what was then called the Kelley process. The great stove industry of Detroit had its inception in 1861, with the factory established by Jeremiah Dwyer, and soon afterward the great car wheel foundries of today had their small beginning. At the same time the machinery building business was rapidly coming to the front. The development and extensive use of steam power created a demand for valves, injectors, lubricators and other devices made of brass. Detroit still supplies a large part of the demand for these goods.

### Pharmaceutical Industry

The enormous pharmaceutical manufacturing business that today is an important part of the city's production

first came into being in 1856, when Frederick Stearns enlarged his small perfumery business and became a manufacturing chemist. This industry passed through four distinct stages of development, as follows:

1. Formative period—1867 to 1874.
2. Botanical research period—1875 to 1882.
3. Standardization period—1882 to 1894.
4. Biological period—1894 to the present time.

During the second period Detroit manufacturers, notably Parke, Davis & Company, sent American scientists to all parts of the world in search of rare plants and herbs that might be used for medicinal purposes. In this way a number of the commonest medicinal products of today were discovered to the world. The third period was devoted to the development of standard preparations while the present period is devoted largely to the development and manufacture of antitoxins, serums and bacterial vaccines. During the past several decades, Detroit has been a center of the country's pharmaceutical industry, with Parke, Davis & Company the largest manufacturer and exporter of pharmaceutical products in the world.

### Paint and Varnish Industry

In shipbuilding, furniture making, the manufacture of shoes and leather goods, and of tobacco and cigars, the city still held to the pioneer industries which had been the foundation of its prosperity. The rise of the paint and varnish manufacturing business came about 1890, and today, while not one of the most important, it is at least an important unit in the city's industries.

### Automotive Industry

The need for some new means of transportation began to make itself felt prior to 1890. Horse-drawn vehicles

were slow, and improved roads invited a speedier means of travel. For some time R. E. Olds had been experimenting with a small steam engine, to be mounted on an ordinary phaeton type carriage. In other workshops other "visionaries" were busy, and by 1890 Charles B. King and Henry Ford had each developed an internal combustion gasoline engine, the former a one-cylinder and the latter a two-cylinder type.

Two years later, the first "Ford" made its appearance on the streets of Detroit. It was a clumsy affair, judged from present-day standards. The ever skeptical public greeted the innovation with laughter. "It will never run up hill," was the opinion. But less than two decades later the successors of this "horseless carriage" were the wonder of the entire world.

No serious attempt was made to market these machines until 1897, when Mr. Olds organized a company, with a capitalization of $50,000, and three cars were manufactured and sold. This company continued for two years and developed a motor of 4½ inch bore and 6-inch stroke, a type used successfully by Mr. Olds for 15 years. In 1898, a company was organized by Detroit capitalists to carry on the experimental work of Henry Ford, but no machines were marketed immediately. Not until 1901 was a Ford model developed which was considered entirely practical. Meanwhile, the original company headed by Mr. Olds had been reorganized, with a capitalization of $350,000, and had been moved to Lansing, Michigan. By 1901 the Oldsmobile Company had produced 425 cars, selling at $600, which could accommodate four passengers each. Thus was laid the foundation for a great industry.

The industries of Detroit were peculiarly fitted to aid in the expansion of the automobile manufacturing business. The many machine shops and marine motor plants, with their skilled workmen, solved the manufacturing and

labor problems connected with turning out automobile motors. The vehicle factories readily were converted to the manufacture of motor car bodies, and the leather industries contributed the upholsteries. Many factories were now devoted to the production of small motor parts and accessories, and it remained only for the genius and capital of Detroit business men to do the rest. The industry stands today as a monument to the ingenuity and persistence of the men who founded it and whose courage and faith during the early period of struggle carried the industry to its present position, second in all the world only to the iron and steel industry.

While the phenomenal growth of the automobile industry held the center of interest for the 15 years from 1895 to 1910, the other enterprises of the city had continued to expand. Many of the allied trades had turned exclusively to the manufacture of parts and accessories, and a large proportion of the concerns in the city owed their unprecedented prosperity either directly or indirectly to the motor car industry, the youngest of them all. Products of the foundry and machine shops, which were valued at $1,800,000 in 1880, increased to more than $18,000,000 in 1910. Bronze and brass products, largely used in motor car manufacture, ranked fifth in value, with a value of $12,000,000.

### Miscellaneous Industries

Sales of food products in 1910 were two and one-half times those of 1890, and the tobacco industry ranked eighth in value of output among similar districts of the United States.

During the decade from 1900 to 1910, the increase of population for the state was about 16 per cent, but for the city the increase was 63 per cent, according to the thir-

teenth census. In 1900 Detroit manufactured approximately 28 per cent of the total production of the state, and in 1910 this had increased to more than 37 per cent. Percentages of the output in the state of commodities in which Detroit led in 1910 are as follows:

| | |
|---|---|
| Meat products | 95.6% |
| Brass and bronze products | 88.5% |
| Structural steel and rolling mill products | 86 % |
| Pharmaceuticals | 85.8% |
| Tobacco and cigars | 78.9% |
| Fur goods | 76.1% |
| Men's clothing | 72.9% |
| Copper, tin and sheet iron | 71.7% |
| Stoves and furnaces | 62.2% |
| Automobiles | 61.6% |
| Leather goods | 54.5% |

Total valuation for the output of Detroit factories in 1910 was more than $254,000,000, something like 10,000 times the value of the output of a century before. Detroit was now a highly developed and efficient industrial community. The census for 1910 gives the population as 492,695. The abstract of the census of manufactures for 1914 gave the following comprehensive view of the sound industrial conditions of the time:

Establishments with products valued at:

| | LESS THAN $5,000 | $5,000 TO $20,000 | $20,000 TO $100,000 | $100,000 AND OVER | TOTALS |
|---|---|---|---|---|---|
| No. of establishments.. | 485 | 628 | 531 | 392 | 2,036 |
| Wage earners | 423 | 2,568 | 8,748 | 87,864 | 99,603 |
| Value of products..... | $1,205,000 | $6,617,000 | $25,467,000 | $367,059,000 | $400,348,000 |
| Value added by Mfr.... | 782,000 | 3,983,000 | 13,648,000 | 159,686,000 | 178,099,000 |

Of the 2,036 manufacturing establishments, the census bureau listed 1,725 under 44 headings. Classified industries with annual outputs valued at $3,000,000 and over were listed as follows:

| PRODUCTS | NO. OF ESTABLISHMENTS | VALUE OF PRODUCTS |
|---|---|---|
| Auotombiles | 122 | $164,076,000 |
| Foundry and machine products | 221 | 29,465,000 |
| Meat products | 13 | 210,321,000 |
| Tobacco products | 157 | 17,044,000 |
| Brass and copper products | 38 | 14,630,000 |
| Pharmaceuticals | 63 | 13,691,000 |
| Printing | 265 | 9,410,000 |
| Malt liquors | 19 | 7,489,000 |
| Bakeries | 275 | 6,454,000 |
| Lumber | 47 | 5,921,000 |
| Stoves | 8 | 4,369,000 |
| Sheet copper and tin | 68 | 3,897,000 |
| Men's clothing | 20 | 3,867,000 |
| Paint and varnish | 10 | 3,383,000 |

In the manufacture of $400,000,000 worth of products, materials worth $222,250,000 were used, and wages amounting to $69,500,000 were paid. This would give a yearly average of nearly $700 to each wage earner. More than 300 factories, representing industries not classified, used nearly $30,000,000 worth of materials in the production of $60,000,000 worth of finished products. These plants employed 15,000 persons, whose wages were about $11,000,000. This represents the industrial scope of Detroit when the war broke out in 1914.

## Detroit in the War

In no other city in the country did the war demand greater change in methods and materials of manufacture than in Detroit, and in no other city was the demand better met.

With the start of the European war in 1914, a number of Detroit factories accepted war orders from the various allied nations, and so when the United States declared

war against Germany, on April 6, 1917, Detroit was prepared industrially to some degree for the vast flood of domestic war orders that poured in. When the armistice was signed on November 11, 1918, nearly every plant in Detroit was engaged in war work and a majority of them were on a 100 per cent war basis.

### Detroit's War Production

Chief among the Detroit munition products were the Liberty airplane motor, the special recoil mechanism for French howitzers, Eagle boats, shells, gun caissons, store wagons, tractors, tanks, motor trucks, uniforms, gas masks, helmets, and one concern manufactured complete airplanes.

### Liberty Motors

The Liberty motor was developed in Detroit, chiefly by Detroit automotive engineers, and the manufacture of these motors was carried on almost exclusively in the city. The Lincoln Motor Co., organized by H. M. and W. C. Leland, the Ford, Dodge and Packard factories were most prominent in the manufacture of this engine.

### Ford Eagle Boats

When the government called for a special type of submarine chaser, Henry Ford immediately set his engineers to work and the Eagle boats were designed. The government placed an order with Mr. Ford for 100 of these boats, and 20 of them had been completed in the great plant erected for the purpose on the River Rouge at the time the armistice was signed. Sixty boats were finally completed for the government shortly after the cessation of hostilities.

### Recoil Mechanisms

It became necessary for the United States to supply large numbers of the recoil mechanism for French howitzers. It was universally believed that only the French factories had the skilled workmen and technicians capable of making these intricate mechanisms, but Dodge Brothers undertook the task. Inside of six months they had started the first machinery in a completed building, 800 by 600 feet, covering 11 acres. They demonstrated that American skilled workmen and technicians were capable of turning out recoil mechanisms that equalled, if they did not excel, the original article manufactured in France.

### Shell Manufactures

Near the end of 1917, the government offered Detroit capitalists a large initial contract for the manufacture of shells. In less than 24 hours a company was organized, capitalized at $2,000,000, an uncompleted factory building intended for another purpose was taken over and preparations for manufacture were put under way.

### War Automotive Products

In addition to the manufacture of Liberty engines, the supply of which reached government requirements before the end of the war, the motor car factories greatly increased their output of trucks. Except those built for war purposes, only 25 per cent of normal passenger car production was carried on during the last year of the war. Owing to railroad freight congestion, thousands of motor trucks were sent overland, with loads of freight, for shipment abroad.

### One Concern's Achievement

One of the most complete transformations from a peace to a war production basis was that of the American Car &

Foundry Company, whose works were originally devoted to car building, iron pipe and general foundry work. In 1915, this company started on war orders for the British government, but in 1918 was working entirely on munitions for the United States government. Between 1915 and 1918, this company installed entirely new machinery and built up a force of 10,800 wage earners. Production included three sizes of shells, gun caissons, gun limbers and store wagons.

### Airplane Manufactures

The making of airplane engines was naturally accompanied by the manufacture of other airplane parts. The automobile body companies undertook this kind of work. The Fisher Body Company not only made airplane bodies but also assembled the planes themselves. Within a month after the signing of the armistice, this company completed its 1,000th DeHaviland plane. A number of Grand Rapids furniture factories also were engaged extensively in the manufacture of airplane bodies and parts.

Automobile and automobile parts factories were not alone in essential war industry. Almost every establishment in the city working in the metals, whether steel, iron, brass, copper or aluminum, and every woodworking, leather and textile establishment as well, took part.

### War Munitions Workers

All of this work was kept up despite the withdrawal of more than 50,000 skilled workmen, who entered the various branches of the army and navy. The industrial census figures for 1917 give the total number of industrial workers in Wayne county, which may be considered rightly as the Detroit industrial district, as 284,000. The present number is estimated variously up to 385,000.

During the war a very large numberof these workers were women, and there are still many women engaged in the factories, many of them now being skilled machine hands.

### Back to Peace Basis

The signing of the armistice brought the cancellation of a host of government contracts and the companies were suddenly confronted with the task of getting back into peace production. This was accomplished before the end of 1919, with little if any diminution of the city's prosperity.

What has been written brings us now to the present. It has been shown that every increase in Detroit's transportation facilities has been accompanied by a corresponding increase of industrial production and commerce. It remains to be shown how present production is hampered by lack of sufficient traffic facilities and what future production may be brought into being by direct water connection with all the ports of the world.

# CHAPTER II

DETROITERS who are at all familiar with the widely diversified character of the industries of their community resent the oft-repeated statement that Detroit is a one-industry city. Of course the automotive industry bulks large in the city's business, but it is by no means the only large industry, nor does the value of automotive products entirely overshadow the combined value of the products of other industries. However, the relative status of the various industries as regards the value of their products, so far as this discussion is concerned at least, will be taken up in another chapter.

## LEADS WORLD IN MANY LINES

It cannot be denied that the automotive industry is by far the largest single industry carried on within the Detroit industrial district. In fact, Detroit is the automotive capital of the world. But the city is also the world's largest manufacturing center for pharmaceuticals, adding machines, stoves, ranges and furnaces, paints and varnishes, marine motors, overalls, electrical devices of certain kinds, soda and salt products, sporting shoes, twist drills, show cases, corsets, gasoline torches, lubricators, tools of certain kinds, trucks, malleable iron, metal beds and perfumes.

Many other industries of large importance may be listed, including the foundry and machine industries, slaughtering and meat packing, tobacco manufacturing, brass, bronze and copper manufacturing and fabricating, cereal products industries, lumber industries, shipbuilding, the manufactures of boots and shoes, chemicals, railroad cars, confectionery, fur goods, furniture, refrigerators, leather and leather goods, pickles, preserves and sauces, books and periodicals, and steam and hot water heating equipment.

## Industrial Stability

It is evident from the wide diversity of Detroit industries that variations in market conditions for any one industry or class of industries can have but small effect on the industrial welfare of the city as a whole. And moreover, not only is the industrial stability of the city safeguarded by this wide diversity of manufactures, but the labor market is also effectually stabilized. The wide opportunity of employment offered by the many industries assures the skilled workman a living regardless of conditions in any one industry. This tends to maintain an adequate labor supply at a reasonable wage at times when many other cities are struggling with labor shortage and its attendant troubles.

## Location of Industries

A peculiar situation has developed in Detroit during the last decade with regard to the location of industries throughout the city. There are no well-defined factory districts, such as are found in most cities. Instead, the plants are to be found in every section. The rapid increase in population since 1910 has caused the city to spread out, so that many large plants, which only a few years ago were located far outside the city limits, now are found in the center of some otherwise pleasant residence district, or even far downtown in the neighborhood of office buildings, shops and theaters. The railroads in nearly every case penetrate close to the center of the city, coming from all directions, and the factories naturally have retained their sites along these tracks. Even the Detroit Terminal Railroad makes a circle that is from one to five miles inside the city limits.

### Development Is Hampered

The lack of segregated factory districts has created a condition wherein the factories and the railroads now find themselves unable to make the necessary extensions of trackage and warehouse space to take care of enormously increased business. And moreover, residence property values in many sections of the city have been seriously affected by the smoke and noise of the factories. Consequently, the time will soon come when it will prove necessary for most of these plants to move to new locations, where more space can be had and where taxes are lower. Already, indeed, there is evident a movement in this direction, many companies buying new sites and putting up plants far away from their original locations.

### Movement Down River

It is generally believed that the Ford developments on the River Rouge will form the nucleus of Detroit's greatest factory district and at the same time of a great industrial port. This district may conceivably extend many miles up and down the Detroit River from the Rouge and several miles inland. This subject will be considered again in a later chapter.

# CHAPTER III

Transportation men concede Detroit only ninth place among the transportation centers of the United States, although the city ranks fourth in population and third as an industrial center. Here we have a situation that proves conclusively the desperate need of the Michigan metropolis for better means of ingress and egress for materials and passengers, and one that causes speculation as to what the city's present industrial status would be had transportation kept pace during the last few years with industrial growth, both actual and potential.

## Transportation Problem

It is true that any city, after it has reached a certain point in its growth and has attained a wide reputation as a place where skilled labor may be had, attracts to itself in ever increasing numbers new industries and new business concerns of all kinds. The only factors that seriously interfere with this progression are lack of housing for workmen and lack of adequate transportation facilities. The fact that Detroit is fourth in population, third in manufactures and only ninth in transportation facilities, indicates plainly one danger that threatens the city's future. If adequate transportation can be obtained, all other problems within the scope of this discussion will be in a fair way to solve themselves.

## Industrial Trackage

Detroit has 3,600 industries within its industrial district, which includes North Detroit, Hamtramck, Highland Park, Dearborn and the down-river villages. Of these industries, 1,411 have private railway sidings, which number 1,708, with a combined capacity of 17,184 cars. Three hundred and thirty-six industries are situated on railroads but have no private sidings. All industries

that have no private sidings, of course, use the team tracks and warehouses maintained by the railroads. The concerns with private sidings use their own sidings for about 75 per cent of their inbound shipments, but only about 10 per cent of outbound shipments, the rest going to the railroad warehouses and team tracks.

### Scope of Rail Service

Counting those that have their lines entirely within the industrial district, Detroit is served by 15 railroads, only 10 of which are major systems. The major roads are the Michigan Central, New York Central, Pere Marquette, Wabash, Grand Trunk, Detroit, Toledo & Ironton, Detroit & Toledo Shore Line, Pennsylvania, Canadian Pacific and the Detroit United Railways.

The Canadian Pacific gives only passenger service, operating its trains in the city over the tracks of the Michigan Central. The Detroit United Railway operates electric lines, giving both passenger and freight service between Detroit and Toledo and various towns in the eastern half of the Lower Peninsula, as far north as Bay City. The Detroit & Toledo Shore Line gives freight service only and is owned jointly by the Grand Trunk and Toledo, St. Louis & Western railroads, serving as a feeder and also largely as a coal road. The Pennsylvania Railroad has tapped Detroit within the year and as yet has not reached capacity service.

### Terminal Railroads

The five lines devoted solely to local freight service are the Delray Connecting Railroad, the Delray Terminal Railroad, the Detroit Terminal Railroad, the Manufacturers' Transit Railroad and the Pere Marquette-Wabash joint line between the Union station in Detroit and Delray. None of these roads serves as a belt line

in the true sense of the term, being used merely for switching purposes and not generally for the transfer of transit cars from one major railroad to another.

### Freight Handling Facilities

The 15 railroads that serve Detroit own 28 freight houses and 62 sets or groups of team tracks, with a combined capacity of 2,989 cars. These freight houses and team tracks are all that are available to accommodate industries that lack private sidings, and all less than carload shipments from larger industries, as well as all of the commercial shippers of the district. A table printed on next page gives the detailed information regarding railroad facilities.

Railroad service in and out of Detroit is seriously hampered by the fact that many of the lines make most of their eastern line connections through Toledo, which forms a sort of "bottle-neck" through which a vast quantity of freight is handled. During the last five or six years, Toledo terminals have been so congested during a greater part of the year that enormous losses have been sustained annually by Detroit shippers, owing to delays. During part of last year, it actually took 22 days to get a transit car across the city of Toledo, not in one but in hundreds of cases.

### "Bottle-neck" Roads

The railroads that actually pass through Toledo or make a majority of their eastern line connections there are the New York Central, Toledo divisions of the Michigan Central, Pere Marquette, and Detroit, Toledo & Ironton, the Detroit & Toledo Shore Line, Pennsylvania Railroad and Detroit United Railways. The Grand Trunk makes its chief connections with the east via the St. Clair River tunnel at Port Huron.

| | No. of Industries on sidings | No. of Sidings | Car Capacity on sidings | No. of Industries using Team Tracks | No. of Team Tracks (sets) | Car Capacity of Team Tracks | No. of Freight Houses |
|---|---|---|---|---|---|---|---|
| Canadian Pacific..... | | | | | | | |
| Delray Connecting R.R Delray Terminal R. R. Local freight service only | 6 | 6 | 1064 | | | | |
| Detroit Terminal R. R. Local freight only | 127 | 244 | 2546 | 11 | 7 | 280 | 2 |
| Detroit, Toledo & Ironton..... | 10 | 23 | 288 | | 3 | 75 | 1 |
| D. & T. Shore Line.... Freight service only | 4 | 15 | 210 | | | | G. T. Terminals |
| Detroit United Ry..... Electric Lines | | | | | 5 | 178 | 3 |
| Grand Trunk..... | 322 | 476 | 3070 | 79 | 7 | 651 | 5 |
| Michigan Central..... | 733 | 719 | 7124 | 242 | 21 | 1214 | 10 |
| N. Y. C..... | 16 | 20 | 824 | | 2 | 124 | 1 |
| Penna. Ry..... | | | | | | | Under Const. |
| Pere Marquette..... | 64 | 68 | 841 | | 12 | 311 | 2 |
| P. M.—Wabash Joint.. Union sta. to Delray | 81 | 95 | 764 | 4 | | | P. M.—Wabash Terminals |
| Wabash..... | 48 | 42 | 453 | | 5 | 156 | 4 |
| Totals | 1411 | 1708 | 17,184 | 336 | 62 | 2989 | 28 |

## Detroit River Tunnel

The Detroit River tunnel, owned and operated by the Michigan Central Railroad, is too important a factor in the Detroit railroad situation to escape mention. The tunnel was constructed between Detroit and Windsor during the period between 1906 and 1910, at a total cost of $8,500,000. The tunnel itself is a remarkable engineering feat, which is fully described in the Transactions of

the American Society of Engineers, Volume LXXIV, for December, 1911.

Up to the time of the opening of the tunnel, when the Michigan Central abandoned its car ferries, 10 ferries were used for the transfer of the traffic across the river. During the season of 1909, a total of 735,753 cars was ferried. At present, approximately 900,000 cars a year are handled through the tunnel, which provides two single tracks. The railroad company asserts that double this number could be handled with certain improved yard facilities at the Detroit end of the tunnel. Railroads which still operate car ferries on the Detroit River are the Grand Trunk, Wabash, Pere Marquette and Canadian Pacific.

### Detroit Steamship Lines

Detroit is the home port, or port of call, of four steamship lines that engage in the lake carrying trade. These are the Great Lakes Transit Company, the Detroit & Cleveland Navigation Company, the White Star Line and the Ashley & Dustin Line. The Great Lakes Transit Company boats ply between Detroit, Chicago, Milwaukee, Duluth and other Great Lakes ports; the D. & C. boats between Detroit, Cleveland, Buffalo, Mackinaw City and intermediate points; the Ashley & Dustin boats between Detroit, Put-in-Bay and Sandusky, Ohio; and the White Star boats between Port Huron, Toledo and intermediate points. The table below gives detailed information;

| NAME | TO | WHARF AT FOOT OF |
|---|---|---|
| Ashley and Dustin | Put-in-Bay and Sandusky, Ohio | First Street |
| D. & C. Navigation Co. | Cleveland, Buffalo, Toledo, Mackinaw City and other Great Lakes Ports | Third Street |
| Great Lakes Transit Co. | Chicago, Milwaukee, Duluth and other Great Lakes Ports | Cass Ave. |
| White Star Line | Port Huron, Toledo and Intermediate Points | Griswold St. |

### Freight Vessel Capacity

These lines operate a total of 37 vessels, with a total freight capacity, excluding two that are used exclusively for passenger service, of 122,500 tons. The Great Lakes Transit Company operates 22 vessels, with a total capacity of 112,300 tons; the D. & C. line, eight vessels, with a capacity of 6,000 tons; the White Star Line, five vessels, with a capacity of 4,000 tons; and the Ashley & Dustin Line, two vessels with a capacity of 200 tons. One of the White Star vessels and one of the Ashley & Dustin vessels are used exclusively for passengers.

### Highway Transportation

Commercial highway transportation in and out of Detroit is dominated by an organization known as the Detroit Transportation Association. This, of course, excludes the transportation facilities maintained individually by many Detroit manufacturers and business houses, concerning which no figures are available. The Transportation Association includes virtually all trucking companies of the city and industrial district, and also all free lance truck men. The association has between 400 and 500 members, with 2,000 motor trucks and 500 team trucks. The total tonnage capacity of all trucks is about 7,000 tons, available for either local or inter-city transport.

There are 70,000 miles of highways in Michigan, about 10 per cent of which is rated as improved. It is estimated that about half of the improved highways comprise those leading out of Detroit. All mileage figures cover only roads outside of municipalities. There are improved highway trunk lines leading from Detroit to Toledo and thence to the east; from Detroit to Port Huron, Bay City and Saginaw; from Detroit to Grand Rapids; and from Detroit to Ypsilanti. The trunk line to Ypsilanti is in course of improvement to Jackson, Battle Creek, Kalama-

zoo and thence toward Chicago. It is pertinent here to note that last year the Michigan legislature and the voters of the state authorized a $50,000,000 bond issue for highway improvement. This amount, together with the federal aid and appropriations by counties, it is said, will total $150,000,000, to be spent during the next 10 years.

### Railway Freight Tonnage

Freight tonnage in and out of Detroit and the Detroit industrial district during the last six years runs up into enormous figures. Outbound freight over steam railroads for 1914, totaled 8,011,301,248 pounds; for 1915 it was 8,726,680,503; for 1916 it was 11,012,560,912; for 1917 it was 11,925,504,732; for 1918 it was 11,926,994,351; and for the first nine months of 1919 it was 9,449,582,486 pounds. No later figures are available.

Inbound freight over steam railroads for 1914 totaled 19,811,786,054 pounds; for 1915 it was 21,943,935,971; for 1916 it was 28,260,641,027; for 1917 it was 31,042,906,-657; for 1918 it was 32,706,774,169; and for the first nine months of 1919 it was 22,931,722,383 pounds.

Outbound freight over electric roads for 1914 was 233,962,400 pounds; for 1915 it was 254,312,500; for 1916 it was 274,657,500; for 1917 it was 305,175,000; for 1918 it was 341,796,000; and for the first nine months of 1919 it was 285,796,875 pounds.

Inbound freight over electric railroads for 1914 was 125,982,400 pounds; for 1915 it was 136,937,500; for 1916 it was 147,892,500; for 1917 it was 164,325,000; for 1918 it was 184,796,000; and for the first nine months of 1919 it was 152,000,625 pounds.

### Steamship Tonnage

Outbound freight by steamships for 1914 was 255,-194,000 pounds; for 1915 it was 259,965,000; for 1916 it

was 248,842,000; for 1917 it was 254,409,000; for 1918 it was 241,828,000; and for the first nine months of 1919 it was 243,952,000 pounds.

Inbound freight by steamships for 1914 was 368,846,000 pounds; for 1915 it was 375,894,000; for 1916 it was 371,394,000; for 1917 it was 380,497,000; for 1918 it was 378,582,000; and for the first nine months of 1919 it was 375,380,000 pounds.

The above figures for steamships include an estimated tonnage of 33,137,400 pounds of through freight inbound and 19,682,800 pounds of through freight outbound. These figures are approximated from daily tonnage estimates and represent an average season of 200 days navigation.

### Highway Tonnage

Outbound freight by trucks for 1918 was 87,640,000 pounds; and for the first nine months of 1919 it was 63,730,000 pounds.

Inbound freight by trucks for 1918 was 87,640,000 pounds; and for the first nine months of 1919 it was 63,730,000 pounds.

### Freight Tonnage Totals

The grand total of outbound freight through all transportation channels for 1914 was 8,500,457,648 pounds; for 1915 it was 9,240,958,000; for 1916 it was 11,536,060,412; for 1917 it was 12,486,088,732; for 1918 it was 12,515,258,351; and for the first nine months of 1919 it was 10,043,061,361 pounds.

The grand total of inbound freight through all channels for 1914 was 20,306,614,454 pounds; for 1915 it was 22,455,767,471; for 1916 it was 28,779,927,527; for 1917 it was 31,587,728,657; for 1918 it was 33,357,792,169; and for the first nine months of 1919 it was 23,522,833,008 pounds.

# DETROIT FREIGHT TONNAGE

## OUTBOUND

| | 1914 | 1915 | 1916 | 1917 | 1918 | 9 months, 1919 |
|---|---|---|---|---|---|---|
| Steam Roads | 8,011,301,248 | 8,726,680,503 | 11,012,560,912 | 11,926,504,732 | 11,926,994,351 | 9,449,582,486 |
| Electric Roads | 233,962,400 | 254,312,500 | 274,657,500 | 395,175,000 | 341,796,000 | 285,796,875 |
| Steamship | 255,194,000 | 259,965,000 | 248,842:000 | 254,409,000 | 241,828,000 | 243,952,000 |
| Trucks | | | | | 87,640,000 | 63,730,000 |
| Total | 8,500,457,648 | 9,240,958,003 | 11,536,060,412 | 12,486,088,732 | 12,515,258,351 | 10,043,061,361 |

## INBOUND

| | 1914 | 1915 | 1916 | 1917 | 1918 | 9 months, 1919 |
|---|---|---|---|---|---|---|
| Steam Roads | 19,811,786,054 | 21,943,935,971 | 28,260,641,027 | 31,042,906,657 | 32,706,774,169 | 22,931,722,383 |
| Electric Roads | 125,982,400 | 136,937,500 | 147,892,500 | 164,325,000 | 184,796,000 | 152,000,625 |
| Steamship | 368,846,000 | 375,894,000 | 371,394,000 | 380,497,000 | 378,582,000 | 375,380,000 |
| Trucks | | | | | 87,640,000 | 63,730,000 |
| Total | 20,306,614,454 | 22,455,767,471 | 28,779,927,527 | 31,587,728,657 | 33,357,792,169 | 23,522,833,008 |
| Grand Total | 28,807,072,102 | 31,696,725,474 | 40,315,987,939 | 44,073,817,389 | 45,873,050,520 | 33,565,894,369 |

The grand total of outbound and inbound freight through all channels for 1914 was 28,807,072,102 pounds; for 1915 it was 31,696,725,474; for 1916 it was 40,315,987,939 for 1917 it was 44,073,817,389; for 1918 it was 45,873,050,520; and for the first nine months of 1919 it was 33,565,894,369 pounds. This total, it is estimated, reached by the end of 1919 about 45,000,000,000 pounds.

The passing tonnage for steam roads at Detroit for one month alone, October 15 to November 15, 1919, was 2,614,920,000 pounds.

It is estimated by competent authorities that approximately 40 per cent of all freight moved in and out of Detroit and the Detroit industrial district, excepting coal, comes from or is moved to the eastern seaboard. Thus the total seaboard traffic for 1919 is estimated at 10,000,000,000 pounds.

TORONTO
HAMILTON
BUFFALO
DETROIT
TOLEDO
CLEVELAND
ERIE
LAKE ST. CLAIR
LAKE ERIE
INTERNATIONAL BOUNDARY
LONG PT. BAY
SAGINAW BAY
BAY CITY
SAGINAW
Port Huron
Sarnia
St Thomas
Chatham
Wallaceburg
Windsor
Walkerville
Amherstburg
Leamington
Kingsville
Pelee Island
Pelee Passage
North Pass
South Pass
Put-in-Bay
Kelleys Island
Sandusky
Huron
Vermilion
Lorain
Rocky River
Ashtabula
Conneaut
Dunkirk
Fredonia
Port Colborne
Welland
Niagara Falls
Port Dover
Simcoe
Jarvis
Selkirk
Port Maitland
Grimsby
Beamsville
Jordan
Dundas
Oakville
Port Credit
Whitby
Oshawa
Cobourg
Port Hope
Colborne
Brighton
Trenton
Belleville
Napanee
Kingston
Gananoque
Brockville
Prescott
Ogdensburg
Cape Vincent
Sackets Harbor
Oswego
Fair Haven
Port Ontario
Mexico
Pulaski
Sandy Creek
Henderson
Stony Pt.
Wilson
Olcott
Lockport
Middleport
Medina
Albion
Brownhelm
Amherst
Elyria
Oberlin
Wellington
Norwalk
Huron
Sandusky
Port Clinton
Marblehead
Catawba Island
Kelleys Island
Put-in-Bay
Middle Bass Island
North Bass Island
Pelee Island
Point Pelee
Leamington
Kingsville
Wheatley
Erieau
Rondeau
Port Stanley
Port Burwell
Port Rowan
Long Point
Turkey Point
Port Dover
Nanticoke
Dunnville
Port Maitland
Fort Erie
Crystal Beach
Chautauqua
Dunkirk
Silver Creek
Forestville
Irving
Buffalo
Tonawanda
Grand Island
Niagara Falls
Lewiston
Youngstown
Fairport
Ashtabula
Conneaut
Geneva
Madison
Painesville
Mentor
Willoughby
Euclid
Cleveland
Lorain
Vermilion
Huron
Sandusky
Port Clinton
Toledo
Maumee River
Detroit River
St. Clair River
Lake St. Clair
Lake Erie
Lake Ontario
Lake Huron
Lake Michigan
Lake Superior

## CHAPTER IV

The Detroit River has a length of about 31 miles. From Lake St. Clair south to the head of Fighting Island, a distance of 13 miles, the improved channel in the river is 800 feet in width, with a minimum depth of 24 feet. From the head of Fighting Island to the head of Ballard's Reef, a distance of seven miles, there is a minimum width on sailing lines of 600 feet and a minimum depth of 22 feet. From Ballard's Reef to deep water in Lake Erie, about 11 miles, there are two channels. These are the Livingstone (downward bound) Channel, which is 300 feet wide and 22 feet deep, and the Amherstberg (upward bound) Channel, which is at least 600 feet wide and 21 feet deep. Just below the Detroit city limits is the River Rouge, which is 150 feet wide and has a depth of 21 feet from its mouth to the second bridge crossing it. Vessels drawing 13 feet can use this stream for a distance of three miles.

In front of the wharves at Detroit the depth of water ranges from 16 to 27 feet. From the River Rouge to Lake Erie, the average depth along the water front is 40 feet, except in a few places.

### Detroit Water Frontage

The total length of available water frontage at Detroit is 74,300 feet, 56,000 feet on the Detroit River and 18,300 feet on the present channel of the River Rouge. The federal government owns 3,150 feet and the city of Detroit 5,300 feet, while the remainder, 65,850 feet, is privately owned. The frontage in actual use comprises 13,600 feet along the Detroit River and 3,800 feet along the Rouge. It has been estimated, however, that at least 75 per cent of the available water front could be used economically if the traffic warranted its development. These figures do not include the water front from River Rouge to the head of Lake Erie, most of which at some future time could be

made available for port development purposes, and indeed, some of which, as far down as Wyandotte, is already in use. Of the 65,850 feet of privately owned frontage, 9,618 feet is held by railroad companies, 17,864 feet by steamship companies, and 185 feet by a dock company.

### Freight Handling Equipment

With the exception of that maintained by the Ford interests on the River Rouge, and the chemical and smelting industries along the Detroit River, virtually no freight handling equipment exists on the wharves at Detroit. There are a few clam shell shovels owned by sand and gravel companies, one modern grain elevator is operated on the water front and only a few lighters in the river. A slip has already been completed by the Ford interests at the plants on the River Rouge. This slip is 250 feet wide, 2,614 feet long and 25 feet deep. At the junction of the slip and the River Rouge, a turning basin large enough for the longest lake vessels has been completed. Ore and coal docks, with the necessary handling equipment, have also been constructed.

### Detroit Port Development

It has been found that the best discussion of the opportunities for port development in the Detroit industrial district and the possible and probable methods of development is contained in a recent address by Capt. William H. Adams, consulting engineer, chairman of the Inland Waterways Committee of the Detroit Board of Commerce. Before giving the pertinent portions of this address, however, a word or so of explanation is necessary.

It is generally considered that the logical location of the great industrial port, which Detroit's growth will sooner or later make necessary, will be on the lower Detroit River, with the Ford developments on the River Rouge as

a nucleus, and that the logical location of the commercial port, which already exists in embryonic form, will be along the water front of the city of Detroit. With this in mind, Capt. Adams' remarks acquire particular significance.

The address follows in part:

### Port Essentials

"What are the elements necessary for the making of a great port?

"First, a waterway of ample depth and width.

"Second, commodious and well-equipped wharves, docks, piers and storage warehouses in which cargoes may be transferred between land and water craft or held in storage awaiting shipping or distribution into the interior.

"Third, a marginal highway back of the wharves upon which all vehicles of land traffic may move as freely as do the boats upon the waterway in front of the wharves.

"Fourth, a hinterland with ample distribution lines, dense in population producing and consuming manufactured goods or raw materials.

"Fifth, an industrial district for the conversion of raw materials of both home and foreign production into finished articles of commerce which may be easily transported by land or water to consumers in other countries.

### Detroit's Present Port Facilities

"Detroit's water front is largely occupied by interests which are making no use of it. The ferry companies and the D. & C. Navigation Company make a reasonable use of a portion of the harbor. Several miles of water front are occupied by railroad property, making practically no use whatever of the harbor. A few industries receive a part of their coal by water, but in the main the river flows peacefully, by carrying a commerce twice as great

as that which enters and clears New York City but benefitting Detroit not at all. Our harbor facilities will shortly be increased by the addition of about ten miles of water front, due to the proposed dredging of the River Rouge from Zug Island to the Ford steel plant. There is some prospect that interests needing water connections may establish themselves in this location, but most of the plans which have been so far announced for industries to locate along this water frontage do not contemplate any extensive use of this new channel. The ideal harbor condition which would include a marginal highway and harbor belt railroad line is not even under consideration by Detroit shipping interests as yet.

### Detroit as an Importing Center

"Detroit is not as well situated as Chicago or Cleveland in regard to a hinterland. This city is not a logical and natural point of breaking bulk, except as the cities of inland Michigan grow great and except as our own state becomes a producer and consumer of the commodities of trade. It does not seem probable to me that Detroit will become a natural port for the distribution of foreign goods. Cleveland, Toledo and Chicago are located at strategic points, Chicago being by far the best located. It is more economical to carry goods as far as they can be carried by ship before breaking bulk, and Chicago should become a great world port, serving as it does a vast and wealthy hinterland.

### The Future Industrial Port Development at Detroit

"The future of the Port of Detroit, I believe, lies along other lines. Engineers of national prominence who have studied the industrial situation here believe that the level land along the river between Detroit and Wyandotte will

be the future industrial city of Detroit. Here is low land in which slips can be dredged, channels cut and the excavated material used for filling. The harbor line can be extended, as the river is very wide at this point. There are ample rail connections in the rear and the conditions are ideal for the creation of an industrial port similar to the great enterprises in Brooklyn and Newark. The development along these lines should not be piecemeal, however.

### A Harbor Commission Needed

There should be created by proper legislative enactment a Port of Detroit district, under whose authority would be included all our water front from Lake St. Clair to Lake Erie. A harbor commission should be created, charged with the responsibility of preparing comprehensive plans for a program of port improvement which will be adequate to our industrial and transportation requirements. This Commission should have power to purchase by condemnation and develop for public use the entire water front of the port district. It should also be charged with the responsibility of developing an industrial port, and to that end should be able to control sufficient land back of the harbor line to permit laying out of the water front to meet industrial needs and proper correlation with other transportation facilities.

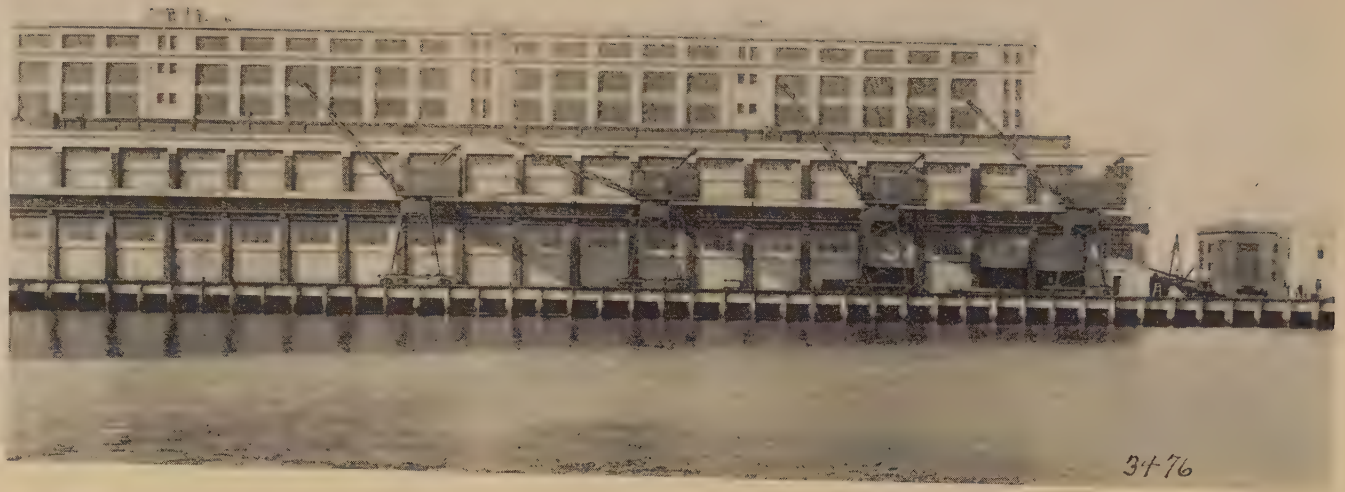
### Package Freight Terminal Requirements

"In the meantime the city needs immediately a west side package freight terminal wharf, and will need similar accommodations on the east side. The city already owns property suitable for this improvement purchased for port purposes. The property at West Twenty-Fourth Street should be improved with a suitable marginal wharf and transit sheds with proper approaches and railroad connections. I am advised by shipping interests

that such a wharf would find immediate use and would be self-supporting from the start. This location alone could add 10 per cent to the city's transportation facilties during the open season, which would probably insure the city against freight embargoes during that time. A plan is now under consideration at the City Hall for making a start toward this improvement.

### A Harbor Belt R. R. An Essential

"In order adequately to meet the third requirement of a port terminal with a commodious public highway, to connect the various wharf warehouses and industries with the greatest freedom of transportation, a harbor belt railroad should be provided upon which the cars of all railroads will be handled upon equal terms and without discrimination. I am aware that the project of a unified public terminal is considered to be dead as far as Detroit is concerned, but I earnestly urge that it is only with such a unified terminal that a modern port can be economically operated. A large ship with miscellaneous cargo will have goods for consignees on every road leading out of its home port. It must be made possible for industries located on any line within Detroit to place a car on any pier or along side of any waterfront warehouse in the port without discrimination. It is not sufficient that this harbor railroad be jointly owned or commonly used by several lines. It has been found almost universally true that where several railroads by joint ownership or as common users have access to wharves or other facilities over the same track they fail to reach an agreement between themselves for a single operating company. Each road insists on using its own engines and switching crew. Each crew disturbs the work which the others have done, causing daily delays in cargo movement and greatly increasing the cost of operation of wharves.




View of Boston Army Supply Base. This is permanent construction and the wharves are mechanically equipped equal to the best European practice. The use of the semi-portal cranes greatly decreases the labor required in stevedoring, and speeds up the turn-around of the ship. Detroit's port development must include mechanical equipment.

### Dispatch Is Required

"It is not possible for boats to move about in the harbor discharging parts of cargo in different places. The large investment tied up in a boat demands that the cargo be loaded or unloaded with the utmost dispatch.

"Wharf warehouses and transit sheds must be provided sufficient to hold entire cargoes which must be distributed or collected by rail or truck.

"Great delays occur at every port where there are no public belts. The success of the harbor belt railroad in New Orleans, Montreal and San Francisco where the entire water front has been retained by the state and administrated impartially in the interests of the whole people has been very marked. Only as a harbor operating plan approaches this condition can the harbor be said to have good facilities.

"A common idea entertained by many people is that a community will have better service if all roads have direct access to all wharves and industries, and this plan has been applied in some ports where several lines are permitted to operate in needless multiplicity on tracks upon the streets without performing any useful service. A public harbor belt can perform a single switching service for all roads at less cost to the individual roads and with far less inconvenience to the public.

"If an industry is to survive it must employ every method of industrial efficiency which the engineer of these days of keen competition has been able to devise.

### Economic Importance of Transportation

"Approximately two-thirds of the cost of all manufactured goods in the United States is embodied in the cost of the raw materials involved, and of this cost an extremely large part is the cost of transportation; therefore, in order that the cost of manufactured products may

be kept within reasonable limits of wasteful transportation, the movements and all methods must be eliminated. It is no doubt true that the greater part of the raw materials entering into Detroit's manufacture could be transported by water or connected to harbor facilities by economical land transportation.

"Practically all the great manufacturing cities of the world are illustrations of this law. Hamburg, Bremen and Antwerp are built on great artificial harbors. The ships of the world sail past Liverpool through the artificial channel dug by the determined and far-seeing citizens of Manchester, and that great city resulted. Manufacturing operations in all our great sea board cities are based on obtaining raw materials by water."

### Detroit River Traffic

The statistical report of Detroit River traffic, prepared by government engineers, shows that the number of vessels using the river during 1919 was 928, of which 815 were American and 113 Canadian craft. Of these, 814 were steamers and 114 sailing and unrigged vessels. Seven hundred and twenty-six of the steamers were of more than 100 registered tons, and the average of all such vessels was 2,702 tons. The average tonnage of the sailing vessels and the unrigged craft was 1,314 tons, and the average of all classes was 2,269 tons.

These vessels made 20,892 passages through the Detroit River during the season of navigation, which opened on March 27 and closed December 18, 1919, a period of 262 days. This was an average of one vessel passing each 13.2 minutes of the entire 24 hours of every day of the season. These figures do not take into account passenger boats, which made about 4,000 passages during the season, nor do they include sand scows and tugs engaged in government work, nor the registered railroad

"Close up" of Semi Portal Cranes at Boston Army Supply Base. In the best European practice these cranes are spaced about 100 ft. apart along the wharf. Several cranes can work at one time on the same ship. Note that these cranes can take cargo from either level of the Transit Shed. The lower level is frequently devoted to outgoing cargo while the upper level handles incoming cargo.

ferry boats. There are also between 1,500 and 1,800 unregistered power boats, of which no complete record is kept.

### Detroit River Tonnage

The net registered tonnage passing through the Detroit River in 1919 was 53,664,705 tons, which was a decrease of nearly 10,000,000 tons from the total of 1918. The reason for this decrease was the unusual shortness of the navigation season, several strikes by marine labor organizations, a shortage of bottoms that was caused by the removal of vessels during the war for use on salt water, and many other adverse conditions. The estimated value of the 1919 tonnage passing through the Detroit River was $979,423,795.

### Tonnage Comparisons

The figures given above form the basis of an interesting comparison of the Detroit River with some of the other famous waterways of the world. The latest available figures for the Panama Canal show that during 1918 there were 2,107 vessel passages, carrying 6,131,675 net tons of freight. This was about 10 per cent of the Detroit River traffic for 1919, which was only slightly less than the traffic for 1918. During 1918, there were 2,522 vessel passages, with a net tonnage of 9,251,601 tons, through the Suez Canal. The total tonnage, entered and cleared, at all of the ocean ports of the United States during 1919 was 92,875,347 net tons.

# CHAPTER V

In order to determine as accurately as possible the facts concerning exports of the Detroit industrial district, a survey of all concerns interested in export trade was made. It was found that 250 manufacturers were actively engaged in this branch of foreign trade and that most of them had organized departments to handle export business, many of the larger manufacturers maintaining export offices in New York to expedite shipments of their goods to world markets.

## Exports of Detroit

The list of articles exported by these concerns forms an interesting illustration of the diversity of Detroit products. It includes:

Automobiles and parts, motor trucks, trailers, valves, paints, enamels, stains, varnishes, brushes, leather and canvas gloves, heating and ventilating systems, exhaust fans and blowers, steam engines, air washers, mechanical draft equipment, electric heated appliances and devices, marine engines, brass goods, injectors, corsets, sheet metal radiators for steam and hot water heating, high speed twist drills, forgings, plastic cements, putties and putty specialties, warm air furnaces, lithographed covers for candy boxes, copper chemical apparatus, japanning ovens, gas machines for industrial use and for country homes, lawn sprinklers, insulated wire and cable, steel wheels and heavy steel stampings, metal furniture, steel barrels and drums, set and cap screws, studs, taper pins, nuts and bolts, steam tubing for boiler flues, show cases and copper store front construction, steel windows for industrial buildings, mechanical stokers, stoves, electric, gas, coal and wood ranges, grinding and drilling machines, gasoline blow torches, drills, cutters and reamers, kerosene and gasoline stoves, water and oil heaters, portable ovens, wire

Export boxes containing dismantled automobiles on cars at a Detroit factory.

wheels, soot blowers for high pressure steam boilers, chemicals and chemical reagents, transformers and electrical instruments, carriage hardware, oil and electric lamps, motor cycles and accessories, fire hydrants, hack and band saws for sawing metal, coal tar products, pruning tools, metal cutting shears, mechanical tire pumps and hand tire pumps, oil and grease guns, oil gauges, shellac, grease and oil cups, oiling devices, small stampings, stereopticon, stage and studio lighting equipment, projection lenses, steel boilers, steel tanks, leather belting, belt lacing, refrigerating machines, milk cans, dairy cans and galvanized wire, adding and calculating machines, brass valves and boiler trimmings, marine specialties, overalls and leather work gloves, torches, fire pots, braziers and preheaters, pharmaceutical products, bacterial products, serums and vaccines, pharmaceutical machinery, flour and corn meal, drugs, pins and chaplets, cotton canvas and waterproof duck, cotton thread, wool hosiery, wool mittens and heavy lumberman's sox, computing scales, dental goods, soda products, tackle blocks, anvils and vises, gears, moulding machines, meats, lard and animal oils, toilet preparations for skin, hair and scalp, chucks and collets, electric furnaces, pyrometers and hot plates, resistance wire and ribbon and chronall, water filters, ships of all kinds, inks, mucilage, paste, sealing wax and liquid glue, dairy supplies, brush making machinery, tire patches, springs, axles and axle shafts, regulators and governors, ornamental iron, bronze and wire products, bank fixtures, artificial limbs, grinding and pulverizing mills, ammonia, salt and salt products, spectacle and eye glass frames and mountings, babbitt metals, solders, ingot brass, brazing spelter, detachable link chain belt, sprocket wheels, wire cloth, screen nettings, wire in all metals in fine gauges, steam traps, switches, switch boards and parts, cranes and hoists, grinding wheels, boiler efficiency instru-

ments, gauges and gas plant instruments, counterbores and surface milling cutters, polishing machines, finished calf skins, plumbing supplies, alkali and alkali products, electric safety switches, wagons, buggies and harnesses, foundry machinery and equipment, clothing, woodworking machinery, boots, shoes and athletic wear, cigars, rubber tires and industrial ovens.

For convenience in discussing the industries of the Detroit district, they will be divided hereafter into broad groups, except in the cases of the most important individual industries. Naturally, the most important single industry is the automotive industry, which will be considered first.

### Automotive Production

As already has been stated, Detroit is the automotive capital of the world. Sixty per cent of the automobiles produced in the entire world are the output of Michigan factories, and of this number, more than half are produced in the Detroit district. The latest available figures show that the total automotive production of the United States in 1918 was 1,153,638 cars, valued at $1,236,106,917. As 1918 was a war year, it is estimated that the 1919 production of the United States was nearly a third more.

### Automotive Group

The automotive industry includes a large number of minor industries, which all must be considered in connection with the export production of the Detroit district for 1919. So in the automotive industrial group are included the following:

Passenger cars, motor trucks, tractors, windshields, mechanical and hand tire pumps, oil and grease guns, oil gauges, grease and oil cups, oiling devices, gasoline motors, transmissions and clutches, motor car belting, wheels, automobile hardware, oil and electric auto lamps,

auto sheet metal parts and bodies, gasoline and kerosene carburetors, primers for small cars, tires and tire accessories, axles, axle shafts and springs, motor car frames, motor car trailers, small motor car parts, stampings, steering gears and auto tops.

### Number of Companies

There are 29 separate companies in the Detroit district, manufacturing 30 different makes of passenger cars, trucks and tractors, and 129 companies devoted exclusively to the manufacture of parts and accessories. These figures do not take into consideration the scores of small shops that make parts, stampings, castings or forgings on contract for some particular automobile company.

The number of employes in automotive plants of the Detroit district, according to the best available authorities, is 135,000, although this number was greatly exceeded during the war period. One manufacturer alone, in but one of his plants, employs nearly 40,000 men. The number of square feet of floor space in automotive plants, both automobile and automobile parts, is estimated at 23,293,861.

### Automotive Exports

During the calendar year of 1919, the automotive industry in the Detroit district allotted an average of 12 per cent of its output for export consumption, the allotments ranging from five to 25 per cent. Thus a total of 531,889 dead weight tons of passenger cars, trucks and tractors, valued at $151,650,273, was sent to foreign markets, excluding what was sent into Canada. A total of 24,098 tons of passenger cars, trucks and tractors was sent over the border.

There are no records existing of exports of automobile parts from the Detroit industrial district, except govern-

ment statistics covering exports into Canada from the entire district of Michigan, which show that during 1919 a total of 15,000 tons of parts were sent into the Dominion, together with 26,527 gasoline motors, weight unknown. What proportion of these exports into Canada was sent overseas is unknown, but it is certain that the proportion was large, and that much of it would naturally have been sent by the Lakes-to-Ocean route had it been in existence.

### Effect of Poor Rail Service

Virtually all automotive products exported by way of the eastern seaboard are sent east by rail, except that during the past year or so numberless cars have been sent overland by highway, while a few companies have employed especially equipped lake vessels to transport cars to Buffalo, whence they were driven overland to the seaboard. There can be no denial that the tremendous automotive industry demands exceptional transportation facilities, particularly at the peakload of production, which is reached during the summer months, when the Lakes-to-Ocean route would be open.

During the last year the lack of transportation facilities was so great that drastic methods were necessary to meet even the domestic demand for cars. Fully 75 per cent of the total production in the Detroit district was driven away from the factories over the highways. Many machines were delivered under their own power at points as far away as Texas and the Pacific Coast, whither they could have been sent by water had the Lakes-to-Ocean route been open. This "drive-away" method of deliveries is an expensive one, as the charges for drivers, fuel and repairs, together with the refinishing that is often necessary at the end of long journeys, amounts in many cases to several hundred dollars a car.

## Effects in Future

Only the unprecedented demand for automotive products, such as has existed for the last year and a half, owing to the suspension of production during the war, could be considered as justification for the present uneconomical methods of transportation employed by the automotive industry. All manufacturers sell f. o. b. Detroit and while conditions have maintained a "seller's" market, transportation costs have not seriously affected the trade, but when a permanent reversal of market conditions comes, as it must come, transportation costs will surely go far toward determining the ability of Detroit and Michigan manufacturers to compete for world trade. This argument, of course, applies equally to the matter of bringing raw material from the eastern states to Detroit.

For example, the freight charge for an automobile from Detroit to Liverpool, by direct water shipment would be little if any more than it now is from New York to Liverpool. The present freight tariff on automobiles by railroad from Detroit to New York is 98.6 cents a hundred pounds. It now takes from three to four weeks to ship an automobile by railroad from Detroit to New York, while the time in transit for the same car from Detroit to Liverpool by vessel through the Lakes-to-Ocean route would be, it is estimated, only about 19 days.

## Possible Transport Savings

The saving that would accrue to Detroit automotive manufacturers if the railroad haul on their products between Detroit and New York could be obviated is indicated by the fact that during 1919 the total freight charges paid on automotive export freight to the eastern seaboard was $10,299,520. It is impossible even to esti-

mate what saving would result from the elimination of railroad delays, but the saving would be very great.

As market conditions and selling methods have combined to make automotive manufacturers indifferent to transportation costs on finished products destined for export consumption, it proved impossible to find even one concern in the Detroit industrial district that was able to estimate with any fair degree of accuracy the amount of transshipment costs from lake to rail and from rail to ocean vessel paid during 1919. There can be no doubt, however, that these costs comprised a large proportion of the total transportation cost.

### Special Equipment Lacking

Of course the lack of railroad equipment which affects all industry throughout the country needs no discussion here, but there are reasons why this lack is especially important as a factor of delay and loss to the automotive industry. The type of railroad car commonly used by the automotive trade for export shipments to tidewater is the flat car. This because automobiles, trucks and tractors for export are packed in specially constructed wooden boxes, which are not easily handled on any other type of railroad equipment. The unit dimensions of these export boxes run about 15′ x 6′ x 4′, each box containing about 400 cubic feet, which is 10 ship tons of 40 cubic feet. There are approximately 900,000 open top freight cars in the United States, only about 10 per cent of which are suitable for these shipments. The New York Central Railroad, for example, has only 66,000 open top cars, of which only 4,044 are flat cars.

### Stove and Range Groups

The stove and range industry is one of the oldest identified with the city of Detroit, and is also one of the largest in the Detroit industrial district. Stoves and

Automobile already packed for export. This picture shows how the car is dismantled and also the special construction of the export boxes.

ranges bearing the mark "made in Detroit" are shipped to every civilized country on the globe, as are the other products under the same classification. For the purposes of this discussion, the following products are grouped together:

Heating and cooking stoves, electric, gas, coal and wood ranges, warm air furnaces, kerosene and gasoline stoves, water and oil heaters, portable ovens, electric furnaces, stokers, boilers and tanks for stoves, marine boilers and stationary boilers, industrial ovens and steam radiators.

Fifteen companies in the Detroit industrial district, which are among those engaged in the manufacture of products listed above, engage in export business. These companies export a total of 10,264 tons, valued at $3,575,000. These figures are approximate, as several concerns were able only to give estimates of the amount of their export business. These products are shipped by freight and express, the freight classifications varying from first to fifth. No company had kept adequate records of freight charges paid during 1919.

### Marine Boiler Shipments

Shipment of marine boilers was reported as restricted to a distance of about 250 miles, owing to the fact that special cars are used for these shipments, the boilers being so large in most cases that it is impossible to carry them through tunnels or across many bridges. Were it possible to load these boilers on vessels for shipment by water, it is probable that Detroit's well equipped boiler factories would find a big demand for their product in foreign markets and on the seaboards.

### Drug and Chemical Group

One of the two or three largest industries of the Detroit industrial district is the drug and chemical industry.

There are six concerns in the district engaged in the production of these materials which engage in export business. One of them, Parke, Davis & Company, is the largest manufacturer of pharmaceuticals and biologicals in the world, while Frederick Stearns & Company, manufacturer of pharmaceuticals and toilet preparations, is the second largest. The following products may be listed as comprising the drug and chemical industry of Detroit:

Drugs, chemicals and chemical reagents, soda and soda products, toilet preparations, pharmaceuticals and biologicals, ammonia, coal tar products and alkali.

Drug and chemical products from the Detroit industrial district are exported to all civilized countries of the world. Some of the largest concerns, notably Parke, Davis & Company, maintain branch plants and sales organizations in all of the principal cities of the world. This cuts down the export totals somewhat, but the amount of the exports under this classification is nevertheless an impressive one. The total exports are 4,290 tons, valued at $4,709,615. These products are nearly all shipped in small packages by mail and express, the value in some instances running as high as $250 a pound. However, some are shipped by freight, including the soda products, most alkali products, ammonia and some coal tar products. Shipments under the drug and chemical classification average about 100 cubic feet to the ton.

### Meat and Meat Products

While Detroit is not one of the largest meat packing centers of the country, still the amount of meat and meat product exports originating within the Detroit industrial district is far from negligible. The total for 1919 was 13,820 tons, valued at $12,765,000. The total of meat and meat products exported during 1919, including what

was sent into Canada for re-export, was $81,437,823. This included all such products coming from Chicago and other western points on the way to Canada.

### Paint and Color Group

The paint, varnish and color industry in the Detroit industrial district is a large one, although exports are comparatively small, this because the great bulk of this product is sold on the domestic market. Products listed under this industrial classification are:

Paints, enamels, stains, varnishes, oils and shellacs.

There are only four concerns in the Detroit district devoted to the manufacture of the products enumerated above, but one of them, the Acme White Lead & Color Works, has the largest plant in the world devoted exclusively to this production. The export total for 1919 was 3,050 tons, valued at $950,000. These products are shipped under fourth and fifth freight classifications, and the number of cars required for their shipment to the seaboard was about 150.

### Copper and Brass Group

Detroit is one of the country's largest centers for the manufacture of copper and brass, and copper and brass products. Exports during 1919, however, were exceedingly small, owing to the fact that during the war the government demanded and received nearly the entire production of the factories engaged in this business and in 1919 the manufacturers were not yet in a position to resume export trade. The products listed under this industrial classification are:

Valves, injectors, boiler trimmings, marine specialties, lubricators, hydrants, regulators, governors, gauges, ornamental bronze products, bank fixtures, steam and plumbing goods, copper chemical apparatus, show cases, copper

store front construction, and to some extent raw brass and bronze.

There are 18 factories in the Detroit industrial district which send a portion of their output to foreign markets. The total of copper and brass exports for 1919 was only 134 tons, valued at $118,000. Manufacturers say that when the great post-war demand in this country has been satisfied to some extent that they will re-enter the foreign markets on a large scale. Most copper and brass products are shipped to the seaboard under the second class freight classification.

### Electrical Machinery Group

An extensive electrical machinery and appliance industry exists in the Detroit industrial district, although there are only nine factories making these products which engage in export business. The products which are listed under this industrial classification are:

Cranes and hoists, transformers and electrical instruments, pyrometers, switches, switch boards and parts, lighting systems, electrically heated appliances, insulated wire and cable, hot plates, resistance wire and ribbon.

The total of exports under this classification during 1919 was 1,430 tons, valued at $600,000. Manufacturers stated that the bulk of these products, which are shipped under the first, second and third class freight classifications, were sent to the seaboard by railway, via Montreal and St. Johns. These shipments might well have been made via the Lakes-to-Ocean route, had it been in existence.

### Clothing Group

The large clothing industry of the Detroit industrial district has few exports, although the imports bulk very large. Manufacturers say that the immense domestic demand for their products, which they are unable to meet,

keeps them out of the export trade. The products listed under this industrial classification are:

Overalls, corsets, clothing, leather and canvas gloves, wool hosiery and mittens, cotton canvas and waterproof cotton duck, cotton thread, boots and shoes and athletic shoes.

Total exports under this classification during 1919 were only 107 tons, valued at $320,750. Most of these goods are shipped under the first class freight classification.

### Marine Motors

The manufacture of marine motors and parts in the Detroit industrial district dates from the earliest practical use of gasoline engines. It was largely the high development of this industry that influenced the establishment in Detroit of the automotive industry. These products are shipped to all countries, but go mostly to parts of the world where shallow draft boats are much used. Five concerns in the Detroit district are engaged in export production of marine motors and parts. The total of exports during 1919 was 4,001 tons, valued at $832,417. These products are shipped by railway to the seaboard as first class freight.

### Machinery and Small Tools

The Detroit industrial district has a large production of machinery and small tools, but during the war the domestic demand for products of this nature was so great that the 25 concerns which had engaged in export business were forced to give up virtually all of their foreign trade. Consequently, in 1919 their export showing was comparatively small. They are beginning, however, to re-enter foreign markets and this trade will shortly assume the large proportions of pre-war days. The products listed under this industrial classification are:

Pharmaceutical machinery, grinding and drilling machines, molding machines, brush making machinery, grinding and pulverizing machinery, polishing machines, gear cutting machinery, wood working machinery, foundry machinery, mechanical draft equipment, drill cutters and reamers, high speed twist drills, metal saws, pruning tools and metal cutting shears, counterbores, tackle blocks, anvils and vises, chucks and collets and grinding wheels.

Total exports during 1919 of products listed above were 1,044 tons, valued at $786,200. These products are sent to the seaboard by railway as first and second class freight. Some machines take a rate that is two times the first class freight rate.

### Leather Products

The extensive leather and tanning industry in the Detroit industrial district shows only a small export total, although the import figures run into many millions of dollars. The list of products under this industrial classification includes:

Leather belts and lacing, leather packing, saddles, harness, and finished calf skins.

Four companies in the Detroit district, which are engaged in the manufacture of the goods listed above, send a part of their output to foreign markets. The total of exports for 1919 was 33 tons, valued at $160,000. These products are shipped to the seaboard as package freight under the first class rate.

### Adding Machines, Etc.

The group of industries comprising adding machine, automatic scale and motor cycle parts manufactures is one of the most important in the Detroit industrial district. Exports of adding machines bulk very large in

value, although the tonnage is comparatively small, owing to the nature of the product. The total of exports for 1919 was 775 tons, valued at $3,045,000. These products are sent to the seaboard by railway as first class freight.

### Iron and Steel Products

For the purpose of this discussion it is necessary to list a rather miscellaneous lot of industries under the heading of manufactures of iron and steel. This list includes the following products:

Pins and chaplets, lawn sprinklers, steel wheels, steel stampings, forgings, castings, metal furniture and novelties, steel window frames for industrial buildings, hardware, gears, detachable link chain belt and sprocket wheels, wire cloth, screen netting and wire.

The total of exports during 1919 under this industrial classification was 2,908 tons, valued at $623,000. The various products listed are shipped to the seaboard under all freight rate classifications.

### Refrigerators and Filters

Mechanical refrigerators and water filters are made to some extent in the Detroit industrial district. The total exports for 1919 of these products was 735 tons, valued at $767,000. These go by railway to the seaboard as first class freight.

### Miscellaneous Exports

There are a number of minor industries in the Detroit industrial district which do not fall naturally under any wide classification. This list includes concerns manufacturing the following products:

Flour, stereopticons and spot lights, spectacle and eyeglass frames, wooden furniture novelties, babbitt metals, inks, mucilage and paste, cements and putties, work organizers and lithographic materials.

All of these industries carry on a desultory foreign trade, which is done mostly by parcel post. The estimated value of these exports is $20,000.

### Total Shipment Costs

As previously stated, nearly all manufactured products are sold f. o. b. Detroit, and consequently only in a comparatively few cases have adequate records been kept of freight charges, insurance, charges for storage in transit and lighterage. However, a few of the larger companies have kept such records. An analysis of these records, used as the basis for further calculations, indicates that total railway freight charges paid by Detroit manufacturers for export shipments to the seaboard during 1919 was somewhere in the neighborhood of $15,000,000; storage in transit, $3,500,000; and lighterage, $2,000,000.

### Total of Exports

The total figures for exports from the Detroit industrial district through American ports of departure other than Detroit are as follows: Tonnage, 574,480; valuation, $180,902,255. This, however, does not indicate the actual export totals for Detroit, but the total of exports originating in Detroit. This because Detroit is a port of departure for a vast export tonnage that is sent into Canada, some of which originates in Detroit, but much of which originates elsewhere.

Exports for 1919 from the customs district of Michigan, comprising the entire state, were $293,981,148. As this total represents the amount of exports recorded by Michigan custom houses, it follows that all these exports went into Canada, some to remain there and some to be sent on to other foreign countries.

### Port of Departure Exports

Approximately 60 per cent of these exports, amounting to $176,388,689, crossed the border through the port of

Detroit. This total does not conflict with the export total given earlier in this chapter, as that total included only exports through American ports of departure other than Detroit, all except in a few minor instances being through the port of New York, and did not include figures on exports to Canada that were mentioned.

### Grand Total of Exports

Taking the total of exports from Detroit and the Detroit industrial district, which was given as $180,902,-255, and adding to it the total of exports into Canada, given as $176,388,689, gives the result, $357,290,944, which is the total of exports from all sources that left Detroit during 1919.

### Food Exports to Canada

A large proportion of the exports into Canada consisted of foodstuffs, classified as follows:

| | |
|---|---|
| Breadstuffs | $ 10,786,598 |
| Confectionery | 521,574 |
| Dairy products | 3,936,873 |
| Eggs | 6,137,861 |
| Fish | 310,946 |
| Fruits | 12,167,979 |
| Meat products | 81,437,823 |
| Nuts | 314,548 |
| Vegetables | 1,567,785 |
| Miscellaneous small items | 236,980 |
| Total | $117,606,616 |

It is probable that virtually all of the exports into Canada included in the above list passed through Detroit. The figures given for meat products include $12,765,000 worth of meat products from Detroit packing houses, the rest coming from Chicago and the west. Other food products listed come from Michigan and states west, and from the south. Virtually all of these food products were destined for European countries, particularly Great

Britain, Belgium and France, which may be taken as an argument in favor of the establishment of a Lakes-to-Ocean route.

### Other Exports to Canada

Other classes of exports into Canada in which the totals amounted to $1,000,000 or more are as follows:

| | |
|---|---|
| Agricultural implements | $ 2,338,753 |
| Automobiles and parts | 32,619,090 |
| Bauxite concentrates | 1,296,500 |
| Chemicals | 5,255,255 |
| Coal and coke | 4,084,362 |
| Copper and copper products | 1,819,326 |
| Cotton, raw | 13,431,559 |
| Cotton, manufactures | 2,781,280 |
| Electrical appliances | 4,341,760 |
| Fibrous manufactures, chiefly binder twine | 1,972,185 |
| Glassware | 919,679 |
| Hides | 3,237,133 |
| Hops | 2,197,363 |
| Iron and steel manufactures | 40,241,481 |
| Leather and leather products | 5,451,766 |
| Oils, including gasoline | 14,781,600 |
| Paper and paper products | 3,402,413 |
| Seeds | 2,180,013 |
| Tobacco, raw | 1,039,821 |
| Wood products | 13,044,645 |
| Manufactures of lead, brass and zinc | 1,703,525 |

The iron and steel products included in the tabulation above comprised more than 100 different classes, many of them of great bulk as well as weight.

### Export Destinations

Prior to the war, about 70 per cent of the exports to Canada from the Michigan district were billed to destinations in Canada, while between 22 and 23 per cent went to England. Most of the remainder went to outlying British dependencies. Exports into Canada destined for other parts of the world were re-shipped at Montreal. Since the armistice, however, there has been a much wider

distribution. The destinations during 1919, according to custom house reports, were as follows:

| | |
|---|---|
| Canada | $206,254,201 |
| Newfoundland | 1,838,385 |
| England | 63,040,978 |
| Scotland | 3,636,496 |
| Ireland | 1,125,502 |
| Belgium | 4,546,857 |
| France | 5,444,312 |
| Netherlands | 1,009,745 |
| Norway | 806,677 |
| Sweden | 295,570 |
| Australia | 640,441 |
| New Zealand | 600,789 |
| British South Africa | 1,303,131 |
| Argentina | 1,204,641 |
| Uruguay | 226,616 |
| China | 136,045 |

It is evident from the above tabulation that much of this tonnage which was eastbound could have been put aboard ocean-going craft at Detroit, thus saving a long, expensive rail haul, had the Lakes-to-Ocean route been in existence.

# CHAPTER VI

It must be admitted that Detroit as an importing center does not nearly measure up in importance with Detroit as a point of export. One reason for this is that the vast majority of articles manufactured within the industrial district are made from raw materials that are produced in the United States, and indeed, produced mostly in the Middle West. Another reason is the peculiar geographical location of the city, with Chicago, Milwaukee and Minneapolis on the west, Toledo on the south and Canada on the east, which restricts to a comparatively small area the hinterland which the city serves with imported goods through the wholesale houses. In fact, Detroit is the wholesale center for a district within a radius of only about 200 miles, all within the state of Michigan.

## List of Imports

The list of imports to Detroit during 1919 includes the following products, according to information supplied by manufacturers, wholesalers and retailers of the city.

Optical glass, plate glass, mirrors, glass tubes, Swedish band saw steel, Swedish iron, other steel and iron products, nickel, gums, hides, duck and linen fabrics, flax, tropical woods, vegetable and flower seeds, salt and fuller's earth, powdered talc, slate, chemicals, oils, gold and silver bars, bristles and hair, asphalt, tin, antimony, lead, crude drugs, abrasives, crude rubber, porcelain, wool, diamonds for industrial purposes, art paper, tea, coffee, raisins, fruits, nuts, olive oil, canned fish, raw sugar, drygoods, shoes, crockery and chinaware, toys and novelties.

As indicated by the names of the products, they are imported from all quarters of the world. Many of them are not imported direct, but come through importing houses in New York. Other products, particularly toys

and novelties, since the war have come from Japan through Pacific Coast ports. This is also true of some tea and coffee.

As in the preceding chapter on exports, the various products will be considered in this chapter by groups, except in the cases of the most important ones.

### Automotive Group

None of the automotive industries of the Detroit industrial district imports any materials direct from foreign sources. The materials that originate outside the United States which are used in the construction of automobiles, trucks, tractors and automotive parts comprise rubber, hides and very small quantities of iron and steel. Virtually all of the crude rubber is made into tires by plants that are situated in Ohio; the hides are imported direct, chiefly from the Argentine, and are tanned and made into car tops and upholstery by Detroit and Michigan plants; and the amounts of foreign iron and steel used in motor car construction are so small as to be negligible. All other materials, such as standard iron and steel, copper, bronze and wood, are produced in this country, and with the exception of some wood, are produced in the Middle West.

### Rubber Imports

A cheaper method of transportation for crude rubber from South America to Middle Western rubber tire plants would have a far reaching effect on the automotive industry. Detroit factories equip their automotive output with more than 50,000 tons of tires annually. Of this tonnage, nearly one-third consists of rubber, and the rest of cotton fabric and other materials used in tire construction.

### Plate Glass

In normal times, all of the plate glass used for automobile windshields is made in the United States. For a

time during the war and immediately afterward, the shortage of plate glass in this country forced the purchase of it from foreign sources.

### Stoves and Ranges

The only material used in the manufacture of stoves and ranges which is not produced in the Middle Western section of the United States is mica, of which less than 100 tons, valued at $1,000,000, was used in 1919. This product is mined chiefly in India and is brought to this country by way of England, although a small quantity is mined in New Hampshire and Canada. It is used for insulation in electric stoves and as ising-glass fronts in heating stoves.

### Drugs and Chemicals

Imports of drugs and chemicals, for use in the manufacture of pharmaceuticals and heavy chemicals, digestive ferments and toilet preparations, so far as any records exist, totaled 2,790 tons, valued at $2,780,500 during 1919. All companies importing these products reported extreme difficulty in obtaining materials from foreign sources during the year and asserted that when normal conditions return imports will increase many fold. Crude drugs and medicinal roots and herbs are drawn from all quarters of the world, most of them coming by way of England. These materials take the first class freight rate between the seaboard and Detroit.

### Paints and Varnish

The paint, varnish and color industries of the Detroit industrial district import a variety of materials from foreign sources, but like most other industries were greatly hampered in doing so by the effects of the war during 1919. The list of imports by these industries includes gums, graphite, China wood oil, peurilla oil from

the Orient, chalk from England, siennas and umbers from Italy and sodium nitrite, which is extensively used in the manufacture of dry colors, from Norway and Sweden.

Only a part of the imported raw materials used during 1919 came direct from foreign sources. It is indicated, however, that 2,380 tons of materials, valued at $1,070,000, came direct, the rest being purchased through New York importing houses.

### Copper and Brass

Importations of ingot metals, plumbago crucibles and glass, which form the bulk of materials drawn from foreign sources for use in the copper and brass industry, were unusually light during 1919. Much of these materials is also normally purchased through New York importing houses. Five hundred tons, valued at $188,808, were reported as coming direct from foreign sources to the Detroit industrial district during 1919.

### Leather Products

Of the four companies in the Detroit industrial district that are engaged in the tanning of leather, and manufacture of leather products, only two import any of their raw materials in the form of hides. These two companies imported direct during 1919 a total of 2,500 tons of hides, valued at $4,000,000. The other companies used domestic hides exclusively. One of the two importing companies brought raw belting leather from England by way of Philadelphia and New York; the other brought calf skins from various European ports by way of New York and Montreal. One of the concerns imported twice as many hides in 1914 as in 1919, the 1914 importations being valued at only half the 1919 importations.

### Iron and Steel Products

Imports of iron and steel products, as indicated by reports from companies in the Detroit industrial district

that used such materials coming from foreign sources, were very small. The total was 225 tons, valued at about $225,000. Most of these products came from England, Norway and Sweden by way of New York and Montreal.

Importations by the electrical machinery and appliance industries comprise slate, porcelain, nickel and very small amounts of steel. The total amount of imports of these commodities during 1919, as reported by concerns using these materials, was 240 tons, valued at $200,000.

### Cloth Importations

Owing to the fact that the clothing business is of a seasonal nature and is subject to extreme fluctuations in style and quality of product, nearly all shipments of imported cloth depend for their value to a large extent on promptness of transportation. Consequently, under present conditions, nearly all of these shipments are made by parcel post and express between New York and Detroit. And moreover, nearly all of these shipments are small in quantity. The total of direct importations of cloth by Detroit clothing manufacturers during 1919 was 1,315 tons, valued at $3,430,000.

### Tropical Woods

Considerable amounts of tropical woods, used in the manufacture of show cases, furniture and furniture novelties, are used in the Detroit industrial district. Most of this lumber comes from Central America and the Phillippine Islands. During 1919 a total of 625 tons of mahogany, 250,000 feet board measure, valued at $83,250, was imported direct.

### Tin, Antimony and Lead

While imports of tin, antimony and lead normally assume measurable proportions in the Detroit industrial

district, during the war they dropped to virtually nothing and since the war have remained so, manufacturers depending on domestic supplies. Purchases of these materials in foreign markets have not been made because of high prices and fluctuations and also because of money exchange difficulties. These materials come largely from England and Japan. In past years most purchases by Detroit manufacturers have been made through New York importing houses.

### Optical Glass

Imports of glass lenses and optical glass to the Detroit district during 1919 totaled only one-half ton, valued at $4,000. These products come from Belgium by way of New York. From the seaboard to Detroit they come as first class freight.

### Flower and Vegetable Seeds

An extensive business in seeds is carried on by several Detroit concerns, although none of them engage to a measurable extent in export trade. One of the city's seed concerns is the largest in the world. Seed imports for 1919 amounted to 1,434 tons, valued at $325,000. These seeds, mostly of flower and vegetable varieties, come direct from Holland, England, Germany, Hungary, Italy and France, by way of New York. From the seaboard they come as fifth class freight in carload lots and as third class freight in less than carload lots.

### Coffee Imports

The consumption of coffee in Detroit in 1919 was 5,145 tons, valued at about $3,143,595. This entered the United States at New York and New Orleans, coming principally from Brazil, although some came from the East Indies to New York by way of Europe. The amount

reaching Detroit in 1919 was 68,600 bags of 150 pounds each, on which the rail freight charges were $36,015.

### Tea Imports

Tea comes to Detroit principally by way of the Pacific ports. The consumption of the city in 1919 was 690 tons, valued at $900,000. Previous to 1906 China sent more tea than Japan, but data for 1919 reveals that Japan's tonnage now exceeds that of China five to one. China tea comes to New York by way of Europe, as does the East Indian tea. Little of the tea that is used in Detroit reaches the city in its original packages, most of it being blended at New York and San Francisco.

### Imports by Retailers

The total volume of retail business transacted in Detroit during 1919 by the seven largest department stores was $80,000,000. The tonnage was approximately 100,000 tons, virtually all of which came from the Atlantic seaboard. Only about five per cent of these amounts, 5,000 tons and $4,000,000, came from foreign sources. It is the opinion of the big retailers that these imports will be greatly increased when conditions in Europe are restored to normal.

The bulk of this merchandise takes the first class freight rate between the seaboard and Detroit, but the time consumed in transportation is of such prime importance, owing to the seasonal and fluctuating nature of the business, that almost half of all goods is sent by express and parcel post. The approximate movement cost, including rail freight, transshipment and demurrage charges, for the $80,000,000 worth of goods from the seaboard, was more than $1,750,000.

Owing to the fact that most Detroit wholesalers do not keep records of a nature to make figures available, it was

impossible to obtain any accurate estimate of the amount of imported goods handled by smaller retail stores of the city and district, except with regard to a few commodities, given earlier in this chapter.

Shoes of all kinds that are consumed in Detroit come largely from the Atlantic states. The total number of tons brought to Detroit during 1919 was 1,875, valued at approximately $25,000,000. This would be 2,500,000 pairs of shoes. No shoes were imported to Detroit during 1919.

### Miscellaneous Imports

The largest importer of toys, tree ornaments, crockery, chinaware, notions and toilet articles in Detroit brought into the country during 1919 approximately 14,000 measurement tons, valued at $14,000,000. This merchandise was received at the ports of New York and Baltimore on the Atlantic seaboard and Tacoma, Seattle, Portland and San Francisco on the Pacific Coast. As little as possible was brought by this concern through New York, owing to inadequate facilities for handling large shipments through that port, and also to excessive transshipment charges.

### Importing Conditions

In connection with Detroit's import trade, a statement concerning conditions made by the foreign trade manager of one of the city's largest importing retailers is of great interest. It is as follows:

"Conditions in the import trade are far from normal and it will be at least three years before Europe will be in a position to take her accustomed place as a source of supplies in many lines for the United States. Detroit is now taking only about 20 per cent of the imported merchandise she is capable of absorbing. At present a large percentage of imports come from Japan. Since 1914,

Germany has not taken an appreciable part in furnishing merchandise, but if the war has not impaired the standard of quality set in pre-war days, that country will probably soon become a factor.

"Compilation of any adequate figures covering imports into the Detroit district is very difficult, owing to the fact that firms using imported goods do not ordinarily keep separate in their records items brought direct from foreign sources, those purchased from domestic sources and those purchased from importing houses on the seaboards.

"Looking ahead three years, it is not unreasonable to say that virtually all of the import totals may be multiplied by five."

## Custom House Reports

Imports into Detroit through the port of Windsor, Ont., for the year 1919 were as follows:

| CLASS OF PRODUCTS | PRODUCED IN CANADA | PRODUCED IN OTHER FOREIGN COUNTRIES |
|---|---|---|
| Agricultural and vegetable products | $ 1,225,907 | $ 128,512 |
| Agricultural products other than foods | 1,634,835 | 62,079 |
| Animals and animal products | 4,815,819 | 107,676 |
| Fibers, textiles and products | 3,046,428 | 28,793 |
| Chemicals and chemical products | 3,656,179 | 143,076 |
| Iron and steel manufactures | 5,572,404 | 2,960,808 |
| Ores, metal and metal manufactures other than iron and steel | 835,918 | 635,482 |
| Non-metallic minerals and products | 957,501 | 38,617 |
| Wood, wood products, paper and manufactures | 17,306,616 | 32,699 |
| Miscellaneous articles | 4,662,962 | 520,122 |
| Totals | $43,714,569 | $4,657,864 |

These figures were supplied by the Canadian government custom house.

### Import Totals

The total of industrial imports into the Detroit district through American ports other than Detroit during 1919 was 9,320 tons, valued at $10,526,058. This total includes imports of optical glass and seeds for sowing. Tea and coffee imports during 1919 were 5,835 tons, valued at $4,043,595. Merchandise imports for 1919 were 19,000 tons, valued at $18,000,000. It is not claimed that the merchandise figures are complete, but they are as complete as the records which were available. As before stated, they are based on the only figures available from wholesalers and retailers of Detroit.

### Import Summary

The total of all classes of imports into the Detroit district through American ports other than Detroit itself during 1919 was 34,155 tons, valued at $32,569,653. The total of all classes of imports into Detroit through the port of Windsor, Ont., during 1919 was 48,372 tons, valued at $48,372,433. The grand total of all imports into the Detroit district during 1919, so far as records exist, was 82,527 tons, valued at $80,942,086.

Before leaving this chapter, it is pertinent to state that the imports into Detroit which are listed as having originated in other foreign countries than Canada might well have come largely through the Lakes-to-Ocean waterway had it been existent.

# CHAPTER VII

Detroit's hinterland includes a territory within a radius of 200 miles to the West and North, all of it lying within the boundaries of the Lower Peninsula of Michigan. This district, however, small as it is owing to the peculiar geographical location of Detroit, comprises one of the richest producing regions of the world. Its products, as are those of Detroit, are shipped to all parts of the globe. Likewise the raw materials used by factories in this district are drawn from all countries.

Like industrial Detroit, the manufactures of the upstate towns are so many and of so diverse a nature that a list of them would be of tedious proportions, but the characteristic products will be considered and a summary presented which will show the advantages to be gained by the hinterland, and by Detroit as a gateway to the hinterland, as a result of direct water communication with foreign markets. In this connection it must be remembered that the Lower Peninsula of Michigan is a network of steam and electric railway lines, and of excellent highways, most of which radiate from Detroit. Almost every industrial community is served by at least two railways. Thus rapid and economical transportation service is provided to and from the distributing center.

## List of Exports

Not a few products of Detroit's hinterland have an international reputation, both for excellence of quality and for workmanship. It would be hard indeed to find a civilized country where Grand Rapids furniture or Battle Creek cereal foods are unknown. Apart from the automobile and accessory industries, the most important and widely known products of Detroit's hinterland are stoves, furniture, vehicles other than automobiles, cereal food products, paper, cigars, drugs and chemicals, corsets,

manufactures of aluminum, cements and essential oils. In the production of most of these, Michigan leads all other states of the country. Besides these varied industries, there are scores of others in which the state holds a place among the leaders, notably the manufactures of beet sugar, agricultural implements and the output of smelting plants, machine shops, foundries, shipyards and flour mills.

### Natural Resources

Many of the industries of southern Michigan owe their existence to the hard wood forests that formerly covered the lower part of the peninsula. The furniture and vehicle industries gained a foremost place early in the history of the state and have held it consistently in spite of the fact that the Michigan timber supply is virtually exhausted and manufacturers depend upon sources outside the state for supplies.

The Lower Peninsula has vast natural resources in deposits of rock salt, limestone, natural brines and other raw materials from which a large part of the chemical products used in the manufacture of explosives, medicines, disinfectants and dye stuffs are made. The area known to be underlaid by salt beds alone is of so great an extent that, a yearly production of millions of tons notwithstanding, it is estimated that the supply is sufficient to last 30,000,000 years at the present rate of depletion.

### Ann Arbor

Exports from Ann Arbor comprise almost entirely baling presses and agricultural machinery. These products are sent to all foreign countries. The total exports for 1919 were approximately 100 tons, valued at $75,000. No imports for industrial purposes are listed for Ann Arbor. Exports are sold boxed for export f. o. b. New

York. Shipments to the seaboard go under the second class freight rate. About 45 carloads of these products, chiefly cotton baling presses for textile mills, were sent during 1919 to the eastern seaboard, going to Boston, New York and Philadelphia for distribution.

### Adrian

Adrian is the greatest center in the world for the manufacture of woven wire fence, and exports comprise this product exclusively. The total exported for 1919 was 2,149 tons, valued at $254,336. This was below normal, owing to labor and material shortages and generally unsettled conditions following the war. No imports for industrial purposes are listed for Adrian. Exports are sent to South America, the northern European countries and Cuba. From Adrian to the seaboard these shipments take the fifth class freight rate and are sold F. A. S. port of New York.

### Jackson

Automotive products and machinery comprise all of the exports from Jackson. Exports of automobiles and other automotive products during 1919 were 10,663 tons, valued at $3,395,000, and of machinery, 295 tons, valued at $160,000. The total of exports was 10,958 tons, valued at $3,555,000. Shipment conditions for automotive products are the same as in Detroit. Machinery is shipped to the seaboard under the fifth and sixth freight rate classifications. Sisal imports for the year 1919 were approximately 1,500 tons, valued at $600,000. This material, used in the manufacture of binder twine, comes from Yucatan by way of New Orleans.

### Battle Creek

Exports from Battle Creek comprise mostly cereal foods, for which the city is famous, printing presses and

agricultural machinery. The export total for 1919 was 20,575 tons, valued at $2,809,000. These goods were sent out of the country chiefly through New York. Miscellaneous industrial imports were 200 tons.

### Kalamazoo

Kalamazoo is one of the most important paper making centers of the United States. The plants in this city are devoted almost exclusively to the manufacture of fine bond, linen and ledger papers. Exports for 1919, as nearly as can be determined, were 36,000 tons of paper valued at $6,048,000. Imports during 1919 were negligible.

### Lansing

Exports from Lansing, the capital city of the state, comprise automotive products, gasoline and kerosene motors, pumps, concrete mixers and warehouse trucks. These products are sent to all parts of the world. The total of exports for 1919 was 4,820 tons, valued at $2,410,000. Of these, 800 tons, valued at $100,000, were gasoline and kerosene motors and pumps; 900 tons, valued at $880,000 were automotive products; and 3,120 tons, valued at $530,000, were concrete mixers and warehouse trucks. No imports are listed for Lansing. Shipping conditions for automotive products are the same as in Detroit. Motors to the seaboard take the fifth class, as do the other export products listed.

### Grand Rapids

Exports from Grand Rapids comprise furniture, show cases, carpet sweepers, gypsum products, refrigerators, window sash pulleys, fly paper, typewriters, metal shelving, woodworking machinery, loose leaf ledgers, facial remedies, bran findings and knit goods. Total exports of furniture products during 1919 were $5,500,000, and of

other products, $1,500,000. The total volume of all products exported was 8,127 tons, and the valuation, $7,000,000. Most of these products were sent by way of New York and New Orleans. Estimated freight costs between Grand Rapids and the seaboards was $483,720. Furniture exports from Grand Rapids go largely to South America, where manufacturers have established agencies in an effort to regain export business that prior to the war gave promise of reaching large proportions. Nearly all South American exports go by way of New Orleans and Mobile. About 100 Grand Rapids firms are now engaging in export business, some of them being the largest of their kind in the world.

The imports into Grand Rapids for industrial purposes comprise almost exclusively mahogany and rare woods from Central and South America. This wood is brought in the log to New Orleans. The logs are sawed into lumber and veneer at mills in Louisiana, Kentucky and other southern states, whence they are brought by rail to Grand Rapids. Imports of mahogany and other rare woods during 1919 were 6,875 tons, or about 2,500,000 board feet, valued at $2,250,000. It is believed that this material might be brought through the St. Lawrence waterway in the log and sawed by Michigan mills at a great saving. Under present conditions the transportation charges are excessive, the total rail charges for 1919, under the sixth freight rate classification, being $28,650 from the southern ports.

### Muskegon

Muskegon exports gasoline motors, automotive parts, electric cranes and billiard and bowling outfits. The total of exports for 1919, sent to nearly all civilized countries, was 3,450 tons, valued at $3,300,000. Most of these products were sent out of the country by way of New York. No direct imports are listed for Muskegon.

### Holland

Exports from Holland comprise furnaces, furniture and pianos. The total of exports during 1919 was about 60 tons, valued in the neighborhood of $60,000. The amount of seaboard freight for that year was estimated as about six times the amount of export freight, or 360 tons, valued at $360,000. No direct imports are listed for Holland.

### Flint

The total of exports from Flint is one of the largest in the state, owing to the city's large importance as an automotive industrial center. Exports comprise exclusively automobiles and parts, the latter chiefly spark plugs and carburetors. Exports for 1919 were 70,250 tons of automobiles, valued at $70,346,000, and 505 tons of automotive parts, valued at $515,000. The total of all products was 70,705 tons, valued at $70,861,000. Conditions governing shipments of automotive products are the same as in Detroit. Direct imports listed for Flint are very small, comprising 40 tons of baled tobacco, valued at $135,000.

### Saginaw

Exports from Saginaw include lumber products, phonographs, gas motors, graphite, cash registers, rules and scales, boilers, seeds, machinery and silos. These goods are sent to all parts of the world, mostly through eastern ports. The total of exports for 1919 was 8,606 tons, valued at $7,109,700. Tonnage destined to the New England states during 1919 was 30,194, tons, valued at $4,784,000. More than half of the New England tonnage was lumber products. No direct imports are listed for Saginaw.

## Bay City

Bay City is one of the largest, if not the largest, producers of "ready-cut" houses in the world. Other industries located in this city involve the manufacture of chemicals, electrical machinery, including cranes and hoists, baby carriages, sugar and automotive parts. Very little sugar and no automotive parts are exported. The city does a large trade with the Atlantic seaboard cities. The total of exports for 1919 was 5,346 tons, valued at $1,639,100. Freight charges to the seaboard were $38,125. The total of seaboard trade during 1919 was 44,140 tons, valued at $4,994,000. Freight charges to the seaboard were $247,848. Most of the "ready-cut" houses that were exported went to France and Belgium although houses were shipped to all parts of the world. Electrical machinery was sent to all parts of the world. Shipments of all commodities listed went chiefly to New York and other New England cities. The rate to New York on houses was 28 cents a hundred pounds, chemicals went as fourth class freight, electrical machinery as fifth class, and baby carriages as first class freight.

## Midland

While Midland is a small community, its exports are comparatively very large, owing to the presence there of one of the largest chemical plants in the world, together with several other industries dependent upon the chemical industry. This is also true of imports. The total of exports during 1919 was 2,893 tons, valued at $1,515,145. These products go to all parts of the world, mostly through New York. They are shipped under the fourth class freight rate, the total rail charges to the seaboard during 1919 being $30,376. Imports during 1919 were 15,444 tons, valued at $4,908,000. These comprised chiefly raw

chemical products. Freight charges on these materials from the seaboard were $162,162.

### Port Huron

Exports from Port Huron comprise engines and threshing machines, lubricating oils, brass and copper products, tools, woodworking machines, gasoline motors, paper, chicory and general farm products. The total of exports for 1919 was 2,270 tons, valued at $2,250,000. These products go to all parts of the world, most of them going across the border at Port Huron on their way to New York. One of the largest companies reported that while in 1919 their export tonnage was only 250 tons, in normal years it would be about 2,500 tons. No direct imports are listed for Port Huron.

### Pontiac

While Pontiac is one of Michigan's most important industrial cities and a large number of products are included in the output of the factories located there, most of these products comprise automotive parts, so that exports are virtually exclusively motor cars and motor trucks. The total of exports for 1919 was 13,600 tons, valued at $8,000,000. The exports go to all parts of the world where automobile vehicles are sold. Shipping conditions are the same in Detroit. No direct imports are listed for Pontiac.

### Export Totals

The totals drawn from the export figures given in this chapter show exports during 1919 from the Detroit hinterland were 133,084 tons, valued at $108,029,781. It is not maintained that these figures are complete, owing to the difficulty of obtaining adequate reports from several of the upstate cities. Adequate figures on imports

through Detroit to the hinterland are unavailable, owing to the fact that nearly all imported goods are bought through eastern importing houses and consequently no records of imports were kept segregated, and also owing to the additional fact that Detroit wholesalers keep no record of imported merchandise sent out into the state separate from the records of imported goods sold in Detroit.

# CHAPTER VIII

THE extent of the coastwise trade of the United States, which is carried entirely in vessels of American registry, is not generally known by people who live in the interior. Inland shippers usually visualize New York, Boston and Philadelphia in terms merely of foreign trade, while it is a fact that the coastwise commerce, between American ports exclusively, is of much greater volume than the actual export and import business.

For example, in 1914 the total foreign commerce of the port of New York was only about 32,000,000 tons, while the total of both foreign and domestic commerce which moved in and out of New York harbor during the same year was more than 100,000,000 tons. Shipping lines engaged in foreign trade occupy only 17.5 per cent of the deep water frontage of Manhattan Island, while coastwise trading companies occupy nearly 25 per cent of the harbor frontage.

A study of the data presented in earlier chapters of this volume will indicate that for every ton of foreign trade freight in which Detroit is interested there are from six to ten tons of freight carried between Detroit and the seaboard for domestic consumption. This will hold approximately true for the other industrial cities of southern Michigan. Thus it is apparent once more that the advantage to Detroit and Michigan shippers and producers which would follow the creation of a dependable water route for deep draft vessels between the Great Lakes and the seaboard would be very great.

The actual movement of freight between Detroit and the eastern seaboard is probably close to 5,000,000 tons annually at this time, and the average rail freight rate probably not less than $16 a ton, making the total rail freight charge approximately $80,000,000 annually. A

study of existing freight rates in coastwise trade reveals that the lake and ocean rate between Detroit and the seaboard would probably not exceed $8 or $10 a ton for miscellaneous freight, making the maximum freight charge by water approximately $50,000,000 annually. Thus the annual saving might be $30,000,000.

With the possibility of such a vast saving in view, there is no doubt that during the navigation season most of the traffic between Detroit and Atlantic coast cities, and even cities situated some distance inland, would choose the water route. Most of the cities of New England, which is the most highly developed section of this country, are within easy trucking distance of seaports, and dependable coastwise shipping offers so many advantages over rail traffic that there is little doubt which route would be used.

With the Lakes-to-Ocean route available, delays in transit, involving disappointed customers and "frozen" credits, which are the expected and almost inevitable experience today, would be replaced by a fast, regular service by package freighters, such as now prevails between Detroit, Cleveland and Buffalo. Seasonable goods would arrive when expected—a wonderful advantage in mercantile lines.

# CHAPTER IX

What has already been written in preceding chapters indicates that an enormous tonnage through the St. Lawrence deep waterway may be expected as soon as the waterway is completed. This chapter will consider the subject of raw materials which are not now brought into the Detroit industrial district, or are brought in comparatively small quantities, on account of excessive freight charges, which could be brought into the district in large quantities with cheap water transportation, and which would thus bring above the horizon of profit industries as yet not in existence, or greatly increase the importance of industries now conducted on a small scale.

The Detroit industrial district, and indeed, nearly all of the southern part of Michigan, supply very few raw materials for industrial purposes. In fact, the Michigan district is devoted almost entirely to fabricating industries, the only extractive industries being salt and soda products in the Lower Peninsula, and copper and iron in the Upper Peninsula. Michigan has virtually ceased to be a lumbering state. While agriculture is an important industry in this state, Michigan is far from being one of the most important agricultural states of the union.

## Furniture Products

The furniture business originated in this state when there was an ample supply of hard woods. The supply of this kind of lumber has been virtually depleted. It is now necessary to bring hardwood lumber from the Northwest and the South, and cabinet woods from Central America and the Orient. Cheap water transportation of these raw materials from the Orient and the Northwest via the Panama Canal and from Central America and the southern states, through the St. Lawrence, could not fail to give the furniture industry a great stimulus. Increased

production would enable the furniture factories of the state to enter the great potential markets of the world, especially in Mexico and South America, on a scale hitherto undreamed of. Both Central and South America abound in rare woods, suitable for veneers, with grains equal to those of circassian walnut and mahogany, which never have been used in this country, owing to excessive freight costs. Direct water transportation would enable the furniture industry to take advantage of these sources of new supply, and to decrease costs by making the veneer in Michigan mills instead of in the south.

### Cigar Box Cedar

More than 4,000,000 board feet of cigar box cedar is used in Detroit each year. The source of this wood is Central and South America. At present the cedar logs are brought to mills on Long Island and the Jersey shore, where they are cut into veneer. Direct water transportation would make possible the shipment of logs to Michigan mills, at a great saving all around.

### Paper Products

Unlimited supplies of spruce timber stand throughout Newfoundland. There is an immediate market for this material in the Michigan paper mills. These mills are now devoted almost exclusively to the manufacture of the finer grades of paper and cardboard. Water transportation would make available this great wood pulp supply, which would enable the Michigan mills to manufacture print paper in vast quantities, in competition with eastern mills.

### Tannery Products

There are 35 tanneries in Michigan, which obtain their hides from Chicago and from abroad. The supply from

Chicago is never large enough to keep the tanneries running all the year around, so it is necessary to bring large quantities of hides from Europe, whither they are sent from South America, South Africa and Australia. Direct water transportation would probably make possible the shipment of hides direct from the sources, thus increasing the supply and decreasing transportation costs. There are other tanning materials shipped from South America to Michigan tanneries, including large quantities of solid quebracho and quebracho extract.

### Cane Sugar Products

Michigan is among the leading beet sugar producing states of the Union. There are 16 sugar mills in the state, which run only three or four months a year, with an annual production of 300,000,000 pounds. The experiment of bringing sugar cane from Cuba for the purpose of utilizing the mills all the year around has been tried, but was not entirely successful, because it was possible to bring only very limited vessel cargoes of cane through the present shallow canals in the St. Lawrence. At least one large Michigan sugar company has asserted that it would maintain a fleet of vessels for the purpose of bringing in cane, should the Lakes-to-Ocean waterway become a fact. Thus approximately 450,000 tons of sugar cane would be brought into Michigan each year, for a production of about 800,000,000 pounds of cane sugar. Only slight changes in sugar mill machinery would be necessary to handle sugar cane, during the period when beets are unavailable.

### Bauxite Products

Although the soda products industries in Detroit and Michigan are quite extensive, no bauxite is imported for use in connection with their processes, the natural brines

found in the state being used in its place. Direct water transportation would make possible the importation of bauxite from England and southern France, which in turn would enable the soda products industries to engage in the manufacture of alum and other aluminum salts used in dyeing.

### Nitrates and Phosphate Rocks

Large quantities of nitrates and phosphate rock, the former coming chiefly from Chile, and the latter largely from Florida and Tennessee, are used in Michigan for fertilizer. Direct water transportation from Florida would greatly cheapen the cost of these materials to the agricultural industry of the state.

### Kaolin Products

The extensive spark plug industry of Michigan requires considerable quantities of Kaolin, a species of china clay that comes almost exclusively from England, mostly as ballast to New York, whence it comes west by railroad. This material could be used very largely in the manufacture of insulators and sanitary ware, were it possible to bring it cheaply to this state. Direct water shipment would probably make it possible to lay Kaolin down in Detroit for about $6 a ton. The only domestic sources of Kaolin supply are small deposits in North Carolina, Georgia, Arkansas and Texas.

### Stone Products

The stone cutting industry in Michigan is hampered by the fact that many kinds of stone and marble that are in much demand must be brought by rail from the quarries in Vermont, New Hampshire and Connecticut. It is probable that the short haul to the seaboard would make it possible to use this material as ballast for vessels coming

from seaboard ports through the St. Lawrence. Manufacturers say this would put them on a competitive basis with seaboard stone cutting concerns.

### Cement Products

Slag, a by-product of the steel industry, is composed chiefly of limestone, which is used to flux the ore in the furnaces. The slag also contains some clay. By a pulverizing and mixing process, this is manufactured into a very fine grade of Portland cement. There is a plant at Gary, Ind., which uses this process on a large scale. It would doubtless be possible to establish such a plant on the River Rouge, where limestone from Alpena and the potential output of 100,000 tons annually of slag from the Ford blast furnaces might be utilized in the manufacture of cement.

### Citrus Fruits

Direct water transportation from Florida and Cuba would make it possible to bring great quantities of citrus fruits into Michigan, eliminating the transshipment delays at eastern ports. This would also apply to bananas from Central and South America. It is said that in Cuba and Latin America much fruit has been wasted on the ground, owing to the difficulty of obtaining transportation, so it is probable that direct water transportation would greatly increase the consumption of such fruits in the Middle West.

### Tobacco Products

Large as the tobacco industry of Michigan now is, there can be little question but what direct water transportation of raw tobacco from the South Atlantic states would stimulate production.

# CHAPTER X

In an effort to ascertain accurately the sentiment in Detroit and Michigan concerning the Great Lakes-St. Lawrence deep waterway project, the field men who came in actual contact with manufacturers, wholesalers and retailers while making the survey upon which this volume is based, were instructed to ask each executive interviewed his opinion as to the possible and probable effects upon his business of a Lakes-to-Ocean waterway that would make Detroit a seaport. Results indicated that the industrial and business interests of the city and state are unaninously and strongly in favor of the project.

## Automotive Industry

The following statements made by heads of automotive industries in the Detroit district and throughout southern Michigan indicate the sentiment to be well developed in favor of water transportation. More statements might be given, but most of them were repetitions of the same opinion.

"The waterway would result in great savings in time and money. It would not affect production necessarily, but would better our distribution to foreign ports, seaboard cities and would permit us to enter many new markets."

"We are certainly pleased to note the interest shown on behalf of Detroit by the Detroit Board of Commerce in this stupendous venture. There is no question but that the Great Lakes-St. Lawrence tidewater project will greatly benefit the exporters of this vicinity."

"Construction of a Lakes-to-Ocean waterway would result in more business and would remove the greatest percentage of delay in shipment of export and other products to the seaboards."

"The waterway would relieve railroad congestion and improve delivery in the export trade."

"A direct and cheaper way to foreign markets would help our business very much."

"Export goods under present conditions are held up for weeks on the docks at New York and Baltimore."

"Continuous vessel passage between Detroit and foreign ports would mean largely increased production for us and more foreign sales."

"The waterway would enable us to get our product to foreign dealers and dealers in seaboard cities at less cost. This would also apply to dealers in cities within 200 miles of the seaboard."

"We do not think the waterway would profit us a great deal in the way of getting new business, but it would result in great savings to us in time and money."

"The waterway would improve general shipping conditions."

"Our serious troubles come in trying to get material here from the eastern seaboard. Due to constant embargoes on the railroads during a large portion of the year, we are often in serious difficulties. We believe the waterway would solve this problem, as well as facilitate export shipping."

"Under present conditions, shipments to New York from all points in Michigan are slow and uncertain, while port charges at New York are excessive."

"The cost of transportation, under present conditions, makes the cost of our product excessive to the customer. The waterway would help, and some day might be the determining factor in competition with seaboard and foreign manufacturers for foreign trade."

### Drugs and Chemicals

The pharmaceutical industries indicate that they would be helped by the Lakes-to-Ocean route. The general opinion of all manufacturers of drugs, chemicals and medicinal preparations may be summed up in the following statement:

"The chief difficulty encountered by the drug, chemical and pharmaceutical industries concerns the importing of raw materials from all parts of the world. A Lakes-to-Ocean waterway, which would eliminate seaboard transshipment delays and costs, would go far toward relieving the situation. We are heartily in favor of the proposition."

### Stoves and Furnaces

Stove and furnace manufacturers are in favor of the waterway, their statement being as follows:

"The waterway would put us on a competitive basis with eastern manufacturers for foreign trade."

### Show Cases

One large concern in Detroit which exports show cases says:

"Continuous vessel passage of our product to foreign ports would eliminate much expensive breakage, and would open all of South America to our industry."

### Copper and Brass

One of the large copper and brass manufacturing concerns in the Detroit industrial district says:

"Future development for our industry lies in the foreign field. The waterway would prove a great asset in our business."

## "Saturation Point"

A great deal has been said and written about a possible "saturation point" in many of the industries of the Detroit industrial district and of Michigan. The prevailing opinion, however, is that in no instance does such a condition prevail, nor will it until some time in the remote future. In some industries it is possible that some time the saturation point may be reached in the United States and Canada, but in no case have foreign markets been developed to any great extent. Nevertheless it is certain that many industries, notably the automotive industry, would be helped to increase production very largely by the construction of a Lakes-to-Ocean waterway.

## Rail Shipment Time

Manufacturers of the Detroit industrial district were asked, "What is the average time necessary for a shipment from Detroit to reach the hold of vessels on the seaboard?"

Replies to the question yielded an average time of 26 days. The answers gave estimates of maximum and minimum time, and the average of maximums was 33.62 days, while the average of minimum was 18.55 days. Many replies elicited were in the form of specific instances, averaging from three weeks to four months. Only four or five manufacturers stated the time to be one week. Not one gave less than a week, even including those who ship by express.

The figures on time of shipments from the seaboard to Detroit were virtually identical with those on shipments to the seaboard.

# CHAPTER XI

Since the earliest days of its history, Detroit has been an important center of the shipbuilding industry, beginning with the yards that were established prior to 1800 for the construction of sailing craft. It was not until after 1850, however, that the present steel shipbuilding industry had its inception. The Detroit Shipbuilding Company, although under another name, was organized in 1853. This company is now a subsidiary of the American Shipbuilding Company. The Great Lakes Engineering Works, which has recently changed hands, was organized in 1903. During the war a smaller concern, known as the Imperial Shipbuilding Corporation, was operated in Detroit, but has since gone out of business, while Henry Ford engaged in the building of submarine chasers.

## Location of Shipyards

Both the Great Lakes Engineering Works and the Detroit Shipbuilding Company have their yards on the Detroit River below the city, the former at Ecorse and the latter at Wyandotte. Both have their outfitting docks in the neighborhood of Orleans Street, not far from the center of the city's water front. The Detroit Shipbuilding Company has a total of ten vessel ways and the Great Lakes Engineering Works a total of six double ways, the equivalent of a dozen ordinary shipways.

## Capacity of Yards

In the days before the war, when the building of lake freighters was at its best, 100,000 tons of ship construction was considered a good year's work for the two Detroit companies. At that time, the Detroit concerns employed about 2,000 men, and their output was confined chiefly to lake freighters and passenger boats. During the war, however, the Great Lakes company alone launched 35

Ocean-going vessel leaving outfitting dock at Detroit shipyard.

freight vessels in one year (1918), with a total tonnage of 121,500. At one period during the year, this company had 3,800 men on its payrolls. During the war the Detroit Shipbuilding Company increased its capacity from four to ten ways and operated at capacity until the armistice was declared.

It had come to be a recognized fact before the war that lake shipyards could build vessels of standard types more quickly and more cheaply than the Atlantic seaboard yards. But it remained for the Great Lakes company to establish a record for war speed in construction. This was done in connection with the building of the steel cargo carrier, Crawl Keys. This vessel was launched 14 days after her keel was laid, and 15 days later was completed and accepted by the United States Shipping Board. The Crawl Keys was not a fabricated ship, but was built from the keel up by the Great Lakes company. She was 261 feet long and 22½ feet deep.

### Eagle Boat Construction

Early in the first year of the war, the government contracted with Henry Ford for 100 vessels of a new type, designed by engineers of the Ford organization. These were the Eagle submarine chasers, concerning which so much has been said and written. For the purpose of building these boats, the Ford interests established a plant on the River Rouge, down river from Detroit.

The main building of this plant, which was 1,700 feet long and 300 feet wide, was fitted with three shipways, each capable of accommodating seven vessels of the Eagle boat type. A fabricating plant, 750 by 100 feet, was built for preparing raw material for use in the shipbuilding plant. The fabricated steel was taken on narrow gauge tracks from the fabricating plant to the shipbuilding plant, where it was served directly from the tracks to the

vessels under construction. These latter were mounted on trucks that ran on tracks extending lengthways of the building. Several groups of operations were required in assembling each boat, and so as fast as one was completed the boat was moved along the track to the next group of workmen, until it emerged at the end of the building all ready for launching. This was done by sinking the truck in the river and permitting the boat to float away.

The Eagle boats were constructed entirely of steel and were virtually unsinkable. Preparations were made for building them on a large scale, but the armistice was signed before many were completed. The Ford interests completed 60 of the 100 boats, the contract for the rest being cancelled. The vessels that were completed were taken by the government for use as gunboats in river patrol work. Since the last boat was completed, the Fords have converted the Eagle plant into a body building plant for automobiles.

### Total War Construction

Since the war, nearly all of the work done by shipbuilding companies in the Detroit industrial district has consisted of completing contracts with the government. Most of the vessels built were of the largest size that would pass through the Canadian canals on the St. Lawrence, while a few larger boats were cut in half for passage through the canals, later being put together again at Montreal. The total number of cargo vessels built for deep sea service by shipbuilding yards of Detroit during the war was 172.

### Lake Fleet Depleted

Some interesting data made available since the signing of the armistice shows that altogether the Great Lakes contributed 149 steamers that formerly had operated in the lake-carrying trade to assist in filling the lack in ocean

Ocean-going vessel in the Detroit River ready for trip through the St. Lawrence to the sea. At the right is a vessel in course of outfitting.

tonnage created by the submarines. How many of these vessels were lost is unknown, but records that have been made public show that 26 were sunk. Complete figures would doubtless increase this figure. Many of these vessels have been sold by the United States Shipping Board and will remain permanently on deep water, while it is probable that a few will ultimately be returned to the lake trade.

Thirty-six American and 44 Canadian bulk freighters, representing 157,366 deadweight tons, with a carrying capacity of 244,500 gross tons, were sent down the St. Lawrence to tidewater. Like the steamers built on the Great Lakes for the Emergency Fleet Corporation, these vessels were loaded with a bottom cargo at lake ports and took on an additional mixed cargo at Montreal, before sailing for ports abroad.

Following is a table of the bulk cargo carrying fleet which was taken from the Great Lakes trade for war purposes:

| | GROSS TONS | CARRYING CAPACITY |
|---|---|---|
| 36 American steel bulk freighters | 72,158 | 114,100 |
| 44 Canadian steel bulk freighters | 85,208 | 130,400 |
| 2 American steel barges | 4,558 | 8,600 |
| 2 Canadian steel barges | 3,463 | 6,200 |
| 13 American wooden bulk freighters | 19,072 | 23,400 |
| Totals 97 vessels | 182,579 tons | 282,700 d. w. tons |

In addition to the bulk carriers, there were 52 package freighters transferred to ocean traffic, none of which have been returned. They were as follows:

| | GROSS TONS | CARRYING CAPACITY |
|---|---|---|
| 32 American package freighters | 73,840 | 95,500 |
| 20 Canadian package freighters | 40,684 | 54,200 |
| Totals 52 vessels | 114,524 tons | 149,700 d. w. tons |

A summary of the above tables shows that altogether the Great Lakes contributed from the previously existing fleet to ocean tonnage a total of 297,103 gross tons, the carrying capacity of which was 432,400 d. w. tons.

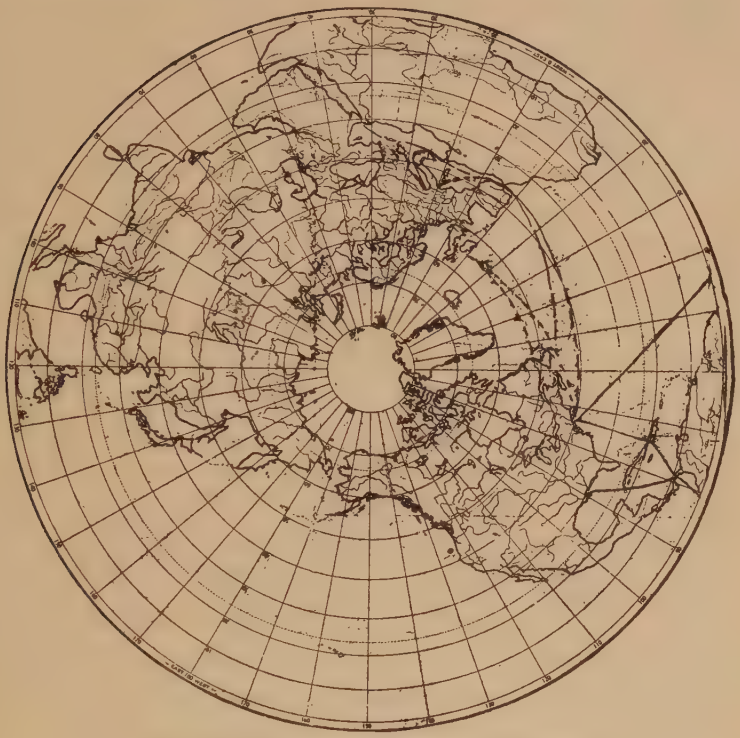
# CHAPTER XII

This chapter will be devoted entirely to a series of maps and tables giving distances, time and costs of voyages from Detroit through the St. Lawrence deep waterway, together with a quantity of miscellaneous data bearing on the general subject of conditions governing Lakes-to-Ocean shipping.

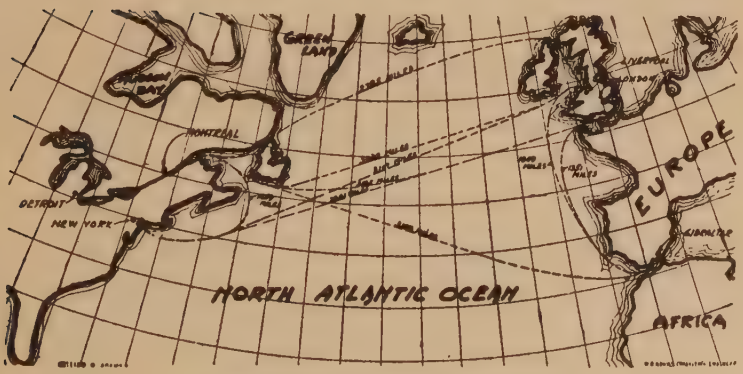
Virtually all of the maps in common use are drawn on what is known as Mercator's Projection, wherein the meridians are represented by parallel straight lines at equal intervals on the equator, and the parallels of latitude by lines perpendicular to the meridians and at increasing intervals, so as to preserve the actual ratio between increments of latitude and longitude. In effect, this distorts the distances when the globe is shown as a flat surface and gives an erroneous impression, which can only be corrected by a chart drawn on the Azimuthal or Polar projection.

It will be seen from the accompanying map that Montreal is nearer Liverpool and London than is New York. In fact, a vessel from England could land at Erie, Pa., in about the same time and at about the same sailing distance as it could at New York. Montreal and New York are about the same distance from Gibraltar. The distance from lake ports by water to Montreal is about the same as the distance from the same ports by rail to New York. All the ports of the Mediterranean and Black seas, North Africa, the Near East and India are just as close to Great Lakes ports by the all-water route as by the rail-and-water route via New York. And to the ports of the Baltic, northern Europe and Russia, the distance is less by several hundred miles.

The accompanying tables give all distances between lake ports and world markets. Other tables give costs between Detroit and Liverpool.



Map of Northern Hemisphere—Polar Projection




Map of North Atlantic Ocean—
Azimuthal Projection

Table showing distances of open and restricted navigation and steaming time between Superior or Duluth and Liverpool via proposed St. Lawrence deep waterway, based on vessels with a cruising speed of 10½ knots, or about 12 statute miles per hour.

| Distances in statute miles | Open Navigation | | | Improved Channel | | | Canals | | Total distance | Total Time | Locks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance | Speed | Time | Distance | Speed | Time | Distance | Time | | | Number | Length | Width | Depth |
| | *Miles* | *Miles per hour* | *Hours* | *Miles* | *Miles per hour* | *Hours* | *Miles* | *Hours* | *Miles* | *Hours* | | *Feet* | *Feet* | *Feet* |
| Duluth to St. Marys River | 383 | 12 | 32 | ..... | ..... | ..... | ..... | ..... | 383 | 32 | ..... | ..... | ..... | ..... |
| St. Marys River and St. Marys Falls Canal | 28.4 | 12 | 2.3 | 33 | 10 | 3.3 | 1.6 | 0.6 | 63 | 6.2 | 1 | 1,300 | 80 | 24½ |
| St. Marys River to St. Clair River | 220 | 12 | 18.3 | ..... | ..... | ..... | ..... | ..... | 220 | 18.3 | ..... | ..... | ..... | ..... |
| St. Clair River | 27 | 12 | 2.2 | 13 | 10 | 1.3 | ..... | ..... | 40 | 3.5 | ..... | ..... | ..... | ..... |
| Lake St. Clair | 13.5 | 12 | 1.1 | ..... | ..... | ..... | 3.5 | .4 | 17 | 1.5 | ..... | ..... | ..... | ..... |
| Detroit River | 22 | 12 | 1.8 | 9 | 10 | .9 | ..... | ..... | 31 | 2.7 | ..... | ..... | ..... | ..... |
| Detroit River to Welland Canal | 219 | 12 | 18.2 | ..... | ..... | ..... | ..... | ..... | 219 | 18.2 | ..... | ..... | ..... | ..... |
| Welland Canal (enlarged) | ..... | ..... | ..... | ..... | ..... | ..... | 25 | 6.0 | 25 | 6.0 | 7 | 800 | 80 | 30 |
| Welland Canal to foot of Lake Ontario | 160 | 12 | 13.3 | ..... | ..... | ..... | ..... | ..... | 160 | 13.3 | ..... | ..... | ..... | ..... |
| St. Lawrence River to Montreal | 117 | 12 | 9.7 | 19 | 10 | 1.9 | {*46 ‡20} | 8.0 | 182 | †19.6 | 6 | 740,800 | 80 | 25–30 |
| St. Lawrence River, Montreal to Belle Isle | 1,003 | 12 | 83.6 | ..... | ..... | ..... | ..... | ..... | 1,003 | 83.6 | ..... | ..... | ..... | ..... |
| Belle Isle to Liverpool | 2,186 | 12 | 182.1 | ..... | ..... | ..... | ..... | ..... | 2,186 | 182.1 | ..... | ..... | ..... | ..... |
| Total | 4,378.9 | ..... | 387.0 | 74 | ..... | 7.4 | {76.1 ‡50.1} | 15.0 | §4,529 | 387.0 | 14 | ..... | ..... | ..... |

*Present restricted canals. With the improvement confined largely to the bed of the river, the time of passage through the upper St. Lawrence would be reduced.

†Proposed for deep waterway.

‡Reducing canal by 26 miles—new project.

§3,936 nautical miles.

The speeds through certain parts of St. Marys River and Detroit River are restricted by existing rules and regulations, and the speeds given above are kept within these requirements, irrespective of the ability of the vessel to make better speed.

Map of Great Lakes-St. Lawrence River system, showing ocean routes and distances.
Prepared by William H. Adams, Consulting Engineer, Chairman Committee on Inland Waterways, Detroit Board of Commerce.

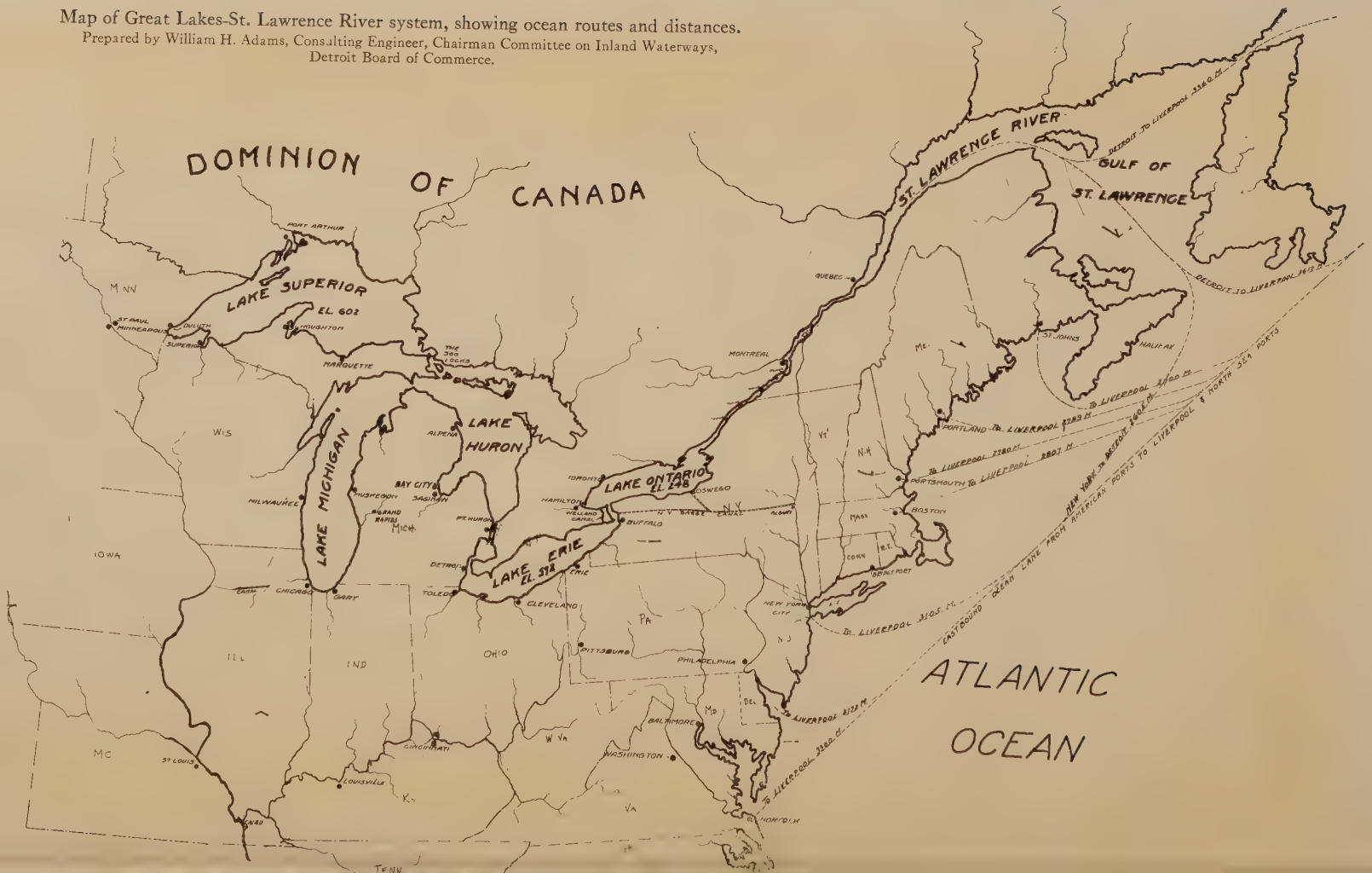


Table showing distances of open and restricted navigation and steaming time between Duluth and Liverpool via New York Harbor, based on Lake and Ocean vessels with a cruising speed of 10½ knots, or about 12 statute miles per hour. Transportation from Buffalo to New York based on barge tow.

| Distances in statute miles | Open Navigation | | | Improved Channel | | | Canals | | Total Distance | Total Time | Locks | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance | Speed | Time | Distance | Speed | Time | Distance | Time | | | Number | Length | Width | Depth |
| | *Miles* | *Miles per hour* | *Hours* | *Miles* | *Miles per hour* | *Hours* | *Miles* | *Hours* | *Miles* | *Hours* | | *Feet* | *Feet* | *Feet* |
| Total of preceding table through Detroit River. | 693.9 | 12 | 57.7 | 55 | 10 | 5.5 | 5.1 | 1 | 748.9 | 64.2 | 1 | 1,000 | 80 | 24½ |
| Detroit River to Buffalo.. | 236 | 12 | 19.7 | ..... | ..... | ..... | ..... | ..... | 236 | 19.7 | ..... | ..... | ..... | ..... |
| New York to Liverpool... | 3,571 | 12 | 297.6 | ..... | ..... | ..... | ..... | ..... | 3,571 | 297.6 | ..... | ..... | ..... | ..... |
| Total for deep-draft vessels..... | 4,500.9 | ..... | 375 | 55 | ..... | 5.5 | 5.1 | ..... | 4,555.9 | 381.5 | ..... | ..... | ..... | ..... |
| Buffalo to Troy via Erie Canal..... | 21 | 4 | 5.2 | 190 | 3 | 63.3 | 130 | *65 | 341 | 133.5 | 35 | 300 | 45 | 12 |
| Troy to New York..... | 155 | 4 | 39 | ..... | ..... | ..... | ..... | ..... | 155 | 39 | ..... | ..... | ..... | ..... |
| Total for barges..... | 176 | ..... | 44.2 | 190 | ..... | 63.3 | 130 | 65 | 496 | 172.5 | ..... | ..... | ..... | ..... |
| Grand total..... | 4,676.9 | ..... | 419.2 | 245 | ..... | 68.8 | 135.1 | 66 | †5051.9 | 554.0 | 36 | ..... | ..... | ..... |

*Allows for lockages and other essential delays.

†4,392 nautical miles.

| | Ogdensburg | Cape Vincent | Kingston | Oswego | Fair Haven | Big Sodus | Charlotte | Oak Orchard | Thirty Mile Point | Olcott | Niagara | Fort Dalhousie | Presque Isle | Port Hope | Whitby | Toronto | Oakville | Hamilton | Port Colborne |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Montreal | 136 | 196 | 201 | 245 | 254 | 264 | 283 | 303 | 316 | 329 | 349 | 359 | 271 | 299 | 330 | 359 | 370 | 583 | 387 |
| Ogdensburg | .... | 60 | 65 | 109 | 118 | 128 | 147 | 167 | 180 | 193 | 213 | 223 | 135 | 163 | 194 | 223 | 234 | 347 | 251 |
| Cape Vincent | .... | .... | 24 | 48 | 58 | 68 | 87 | 107 | 120 | 133 | 153 | 163 | 75 | 103 | 134 | 163 | 174 | 287 | 191 |
| Kingston | .... | .... | .... | 55 | 64 | 71 | 88 | 108 | 121 | 134 | 154 | 164 | 76 | 104 | 135 | 164 | 175 | 188 | 192 |
| Oswego | .... | .... | .... | .... | 14 | 27 | 57 | 85 | 99 | 112 | 135 | 145 | 68 | 93 | 123 | 148 | 158 | 170 | 173 |
| Fairhaven | .... | .... | .... | .... | .... | 15 | 47 | 75 | 90 | 103 | 125 | 135 | 65 | 88 | 116 | 138 | 149 | 160 | 163 |
| Big Sodus | .... | .... | .... | .... | .... | .... | 33 | 63 | 77 | 92 | 112 | 123 | 60 | 78 | 105 | 126 | 136 | 149 | 151 |
| Charlotte | .... | .... | .... | .... | .... | .... | .... | 35 | 48 | 62 | 82 | 92 | 49 | 57 | 78 | 98 | 107 | 119 | 120 |
| Oak Orchard | .... | .... | .... | .... | .... | .... | .... | .... | 15 | 29 | 50 | 61 | 49 | 39 | 48 | 65 | 75 | 186 | 89 |
| Thirty Mile Point | .... | .... | .... | .... | .... | .... | .... | .... | .... | 13 | 34 | 44 | 58 | 40 | 38 | 50 | 59 | 70 | 72 |
| Olcott | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 20 | 32 | 68 | 46 | 35 | 40 | 47 | 59 | 60 |
| Niagara | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 16 | 87 | 62 | 40 | 31 | 33 | 42 | 44 |
| Fort Dalhousie | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 98 | 71 | 46 | 30 | 25 | 31 | 28 |
| Presque Isle | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 33 | 65 | 95 | 108 | 121 | 126 |
| Port Hope | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 35 | 65 | 78 | 92 | 99 |
| Whitby | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 32 | 46 | 61 | 74 |
| Toronto | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 18 | 33 | 58 |
| Oakville | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 16 | 53 |
| Hamilton | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 85 |
| Port Colborne | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 0 |

| | Port Colborne | Dunkirk | Long Point | Erie | Ashtabula | Port Stanley | Fairport | Rondeau | Cleveland | Lorain | Pelee Spit | Sandusky | Bar Point | Monroe | Toledo | Detroit | Fort Gratiot Light Lake Huron |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buffalo | 20 | 35 | 64 | 80 | 117 | 124 | 145 | 162 | 173 | 194 | 198 | 220 | 232 | 240 | 255 | 256 | 321 |
| Port Colborne | | 26 | 48 | 66 | 103 | 108 | 129 | 146 | 157 | 178 | 182 | 204 | 215 | 224 | 239 | 240 | 305 |
| Dunkirk | | | 36 | 45 | 84 | 96 | 111 | 133 | 140 | 162 | 168 | 188 | 202 | 210 | 225 | 226 | 291 |
| Long Point | | | | 27 | 57 | 60 | 82 | 98 | 110 | 131 | 134 | 155 | 168 | 176 | 191 | 192 | 257 |
| Erie | | | | | 43 | 71 | 73 | 99 | 101 | 124 | 132 | 150 | 165 | 174 | 187 | 188 | 252 |
| Ashtabula | | | | | | 55 | 26 | 63 | 56 | 78 | 88 | 105 | 121 | 130 | 145 | 146 | 211 |
| Port Stanley | | | | | | | 61 | 45 | 83 | 94 | 85 | 112 | 118 | 127 | 142 | 143 | 208 |
| Fairport | | | | | | | | 47 | 30 | 51 | 63 | 78 | 97 | 105 | 120 | 121 | 186 |
| Rondeau | | | | | | | | | 52 | 55 | 40 | 67 | 74 | 82 | 97 | 98 | 163 |
| Cleveland | | | | | | | | | | 25 | 47 | 53 | 81 | 89 | 102 | 105 | 170 |
| Lorain | | | | | | | | | | | 30 | 29 | 63 | 72 | 78 | 88 | 153 |
| Pelee Spit | | | | | | | | | | | | 28 | 33 | 42 | 57 | 58 | 123 |
| Sandusky | | | | | | | | | | | | | 47 | 46 | 57 | 69 | 134 |
| Bar Point | | | | | | | | | | | | | | 13 | 32 | 24 | 89 |
| Monroe | | | | | | | | | | | | | | | 21 | 36 | 101 |
| Toledo | | | | | | | | | | | | | | | | 56 | 121 |
| Detroit | | | | | | | | | | | | | | | | | 65 |

## Estimated sailing time in days from Detroit to:

| | |
|---|---|
| London | 19 to 21 |
| Liverpool | 14 to 19 |
| Harve | 12 to 19 |
| Bordeaux | 17 |
| Hamilton, Bermuda | 8 |
| Rio de Janeiro | 21 to 25 |
| Buenos Aires | 21 to 25 |
| Valparaiso | 35 |
| Hong Kong—Suez | 63 |
| Hong Kong—Trans-Pacific Panama Canal | 51 |
| Shanghai—Suez | 67 |
| Shanghai—Trans-Pacific Panama Canal | 48 |
| Havana | 9 |
| Copenhagen | 17 to 21 |
| Singapore | 50 |
| Melbourne | 60 |
| Sydney | 52 |
| Auckland | 41 |
| Rotterdam | 20 to 23 |
| Bombay | 45 |
| Calcutta | 50 |
| Naples | 21 |
| Kingston, Ja | 10 |
| Yokohama—Trans-Pacific Panama Canal | 35 |
| Yokohama—Suez | 35 to 95 |
| Vera Cruz | 13 |
| Progreso | 11 |
| St. Johns | 9 to 10 |
| Christiania | 17 |
| Colon | 12 |
| Callao | 17 to 25 |
| Manila—Trans-Pacific Panama Canal | 52 |
| Manila—Suez | 57 |
| Vladivostock—Pacific | 65 |
| Barcelona | 27 |
| Stockholm | 20 to 25 |

## Days from New York to:

| | |
|---|---|
| London | 12 |
| Liverpool | 9 to 12 |
| Havre | 7 to 14 |
| Bordeaux | 12 |
| Hamilton, Bermuda | 3 |
| Rio de Janeiro | 16 to 20 |
| Buenos Aires | .. |
| Valparaiso | 30 |
| Hong Kong—Suez | 58 |
| Hong Kong—Trans-Pacific | 46 |
| Shanghai—Suez | 62 |
| Shanghai—Trans-Pacific | 43 |
| Havana | 4 |

| | | |
|---|---|---|
| Copenhagen | | 12 to 16 |
| Singapore | | 45 |
| Melbourne | Australasia, including New Zealand | 55 |
| Sydney | | 47 |
| Auckland | | 36 |
| Rotterdam | | 15 to 18 |
| Bombay | | 40 |
| Calcutta | | 45 |
| Naples | | 16 |
| Kingston, Ja | | 5 |
| Yokohama, Pac | | 30 |
| Yokohama—Suez | | 80 to 90 |
| Vera Cruz | | 8 |
| Progreso | | 6 |
| St. Johns | | 4 to 5 |
| Christiania | | 12 |
| Colon | | 7 |
| Callao | | 12 to 20 |
| Manila—Pacific | | 47 |
| Manila—Suez | | 52 |
| Vladivostock—Pacific | | 60 |
| Barcelona | | 22 |
| Stockholm | | 15 to 20 |

## VOYAGE CALCULATION—PACKAGE FREIGHT

5500 D. W. Ton Freighter—Detroit to Liverpool and Return
Voyage 6634 Miles—54 Days Turn around
Value of Ship $825,000.00
Lay-up 30 Days per Year

| | | |
|---|---|---|
| **FIXED CHARGES** (Including proportion lay-up time) | | |
| Insurance 6% | $ 7,960.00 | |
| Port Dues and Pilotage | 4,500.00 | |
| Bond Interest ½ value 6% | 4,000.00 | |
| Depreciation 5% on Value | 6,650.00 | |
| Sinking Fund 9% on Value | 12,100.00 | |
| Interest on Capital Stock, ½ Value, 7% | 4,165.00 | |
| Interest on Working Capital | 300.00 | |
| | | $39,675.00 |
| **OPERATION EXPENSE** | | |
| Maintenance at 85c per D. W. Ton per Month | $ 7,500.00 | |
| Loss and Damage | 600.00 | |
| Fuel Oil at $10.00, 775 Tons | 7,750.00 | |
| Water | 150.00 | |
| | | 16,000.00 |
| **CREW WAGES AND SUBSISTENCE** | | |
| Deck Crew 9 | 2,575.00 | |
| Engine 13 | 3,180.00 | |
| Stewards 9 | 1,380.00 | |
| Subsistence 31 at 90c per day per man | 1,640.00 | |
| | | 8,775.00 |

| | | |
|---|---|---|
| STORES | | |
| Deck | 675.00 | |
| Engine | 770.00 | |
| Stewards | 562.00 | |
| | | 2,007.00 |
| Cargo Handling | | 5,750.00 |
| Total charges | | $72,207.00 |
| Cost per ton cargo carried—no return cargo | | $15.60 |
| Cost per ton cargo carried—cargo returned, ½ load | | 10.92 |
| Cost per ton cargo carried—cargo return, full load | | 8.46 |

| ITINERARY | | DEADWEIGHT LIST | |
|---|---|---|---|
| Detroit | 8 days | Cargo | 4600 |
| En Route Liverpool | 19 days | Bunkers | 775 |
| Liverpool | 8 days | Water | 100 |

Modern shipbuilding practice defines within narrow limits the ratio which the draft of a deep water cargo ship shall bear to its length and breadth, and therefore the depth of water at loading and unloading points determines the size and capacity of the ships that use them. The economic size of ocean carriers to navigate the lakes under these conditions would consequently be about 7,000 tons deadweight carrying capacity. Statistics from authoritative sources show that more than 80 per cent of all oceangoing craft, aggregating nearly 37,000,000 tons deadweight capacity, come under this classification. Deadweight capacity includes actual weight of cargo, fuel and stores.

The distribution of tonnage at the close of 1919 was as follows:

Less than 1,500 tons, 12,501 ships, aggregating 6,563,340 tons; above 1,500 tons and under 3,000 tons, 3,251 ships, aggregating 6,401,400 tons; above 3,000 tons and under 7,000 tons, 5,250 ships, aggregating 23,951,000 tons; above 7,000 tons and under 15,000 tons, 3,126, ships, aggregating 27,288,000 tons; above 15,000 tons, 238 ships aggregating 5,303,000 tons.

Of the ships under 7,000 tons carrying capacity, the aggregate tonnage amounts to 36,915,740. A large pro-

portion of this vast amount of shipping would be immediately available and would be attracted to the new Lakes-to-Ocean route.

UNITED STATES TABLE OF SHIPS ASSIGNED TO VARIOUS ROUTES IN WORLD TRADE

New York to Argentine.....5000 to 9000 tons deadweight
Boston to Argentine.....4200 to 9000 tons deadweight
Mobile to Argentine.....5075 to 6200 tons deadweight
New Orleans to Argentine.....5075 tons deadweight
Wilmington, N. C.. to Argentine.....7500 to 9000 tons deadweight
New York to Brazil.....5075 tons deadweight
New York to Rio Janeiro.....5075 to 8650 tons deadweight
New Orleans to Rio and Santos.....5075 tons deadweight
New York to Valparaiso.....5075 to 6982 tons deadweight
New York to Egypt.....4300 to 5075 tons deadweight
New York to Bombay.....7500 tons deadweight
New York to Danzig.....5000 tons deadweight
New York to Constantinpole.....7300 to 9000 tons deadweight
New York to West Africa.....6200 to 8800 tons deadweight
New York to South Africa.....6100 to 7500 tons deadweight
New York to China.....7500 to 9600 tons deadweight

In order to obtain an idea of the relative sizes and capacities of cargo carriers, the following table of averages is appended:

| DEADWEIGHT CARRYING CAPACITY | LENGTH KEEL | BEAM | LOAD DRAFT | SPEED LOADED |
|---|---|---|---|---|
| 1,000 tons | 185′—0″ | 29′—0″ | 13′—0″ | 10 knots |
| 2,000 tons | 227′—0″ | 32′—6″ | 17′—0″ | 10 knots |
| 2,500 tons | 250′—0″ | 35′—0″ | 18′—0″ | 10 knots |
| 3,000 tons | 250′—0″ | 43′—6″ | 20′—0″ | 10 knots |
| 4,000 tons | 304′—0″ | 46′—9″ | 20′—0″ | 10 knots |
| 4,500 tons | 334′—0″ | 48′—0″ | 21′—0″ | 10 knots |
| 5,690 tons | 350′—0″ | 49′—0″ | 21′—9½″ | 10 knots |
| 8,200 tons | 400′—0″ | 54′—0″ | 24′—0″ | 10 knots |
| 8,800 tons | 423′—0″ | 54′—0″ | 24′—1″ | 11 knots |
| 10,000 tons | 450′—0″ | 59′—0″ | 26′—2″ | 10 knots |
| 14,000 tons | 500′—0″ | 65′—0″ | 28′—5″ | 10 knots |

# CHAPTER XIII

At the outset of this volume, it was stated that the basic economic law which would govern every consideration could be summed up in the phrase "transportation governs production." It is now submitted that, with this phrase as a text, the vital need of Detroit, the Detroit industrial district and the state of Michigan for additional transportation facilities, including a direct, all-water route to the ports of the world has been demonstrated. That this route will be logically the Great Lakes-St. Lawrence deep waterway is a matter for the consideration of the United States and Canadian government engineers.

It has been shown how, in the beginning, Detroit and Michigan were dependent upon water transportation for their growth and welfare; how, as the city and state grew industrially, they became dependent upon the railroads, while water transportation to a great extent was ignored; and how, since the city and state have outgrown all existing rail facilities, and probably will continue to outpace them, they must return to waterway transportation to relieve the railroads of the peakload of traffic, in order to maintain their present positions among the greatest industrial cities and districts of the entire world.

The figures given in preceding chapters prove the importance of Detroit as an exporting city, not only for itself but for the small but extremely important territory which it serves as a gateway. They also prove the importance of Detroit as an importing and distributing center, although to a lesser degree.

The waterway would enable shippers of Detroit's hinterland to move their products rapidly and economically to foreign and seaboard markets, just as in the city freight cars are rapidly distributed among the factories by means of the terminal railroads, without the necessity of crowding through congested downtown yards.

The waterway would encourage the establishment of importing houses in Detroit and would enable Detroit jobbers to serve an increased circle of merchants and dealers. The banks would add departments to handle the financial transactions involved in foreign trade. Manufacturers who maintain expensive export departments on the seaboard would move them to the home office, thus eliminating a heavy overhead charge.

The waterway would put Detroit and Michigan industries more nearly on an equal competitive footing with similar seaboard and foreign industries. It would not only effect an actual saving in time and money to purchasers of Detroit and Michigan goods in both foreign and domestic seaboard markets, but would assist in the creation and building up of new industries that are now below the horizon of profit.

As in the past, each increase in transportation facilities has been reflected by a corresponding increase in industrial and trade activity along new lines or in further development of existing ones, so in this instance, the Lakes-to-Ocean route would have its effect toward the growth and the betterment of conditions in industry and trade, and as a corollary, the betterment of conditions among the people, for whom industry and trade exist.

# APPENDIX A

FIGURES only just made public by the United States Bureau of Foreign and Domestic Commerce, covering the fiscal year ending June 20, 1920, give Detroit fifth place among exporting cities of the country. These figures show the first five cities in point of importance to be New York, Galveston, New Orleans, Philadelphia and Detroit.

The report that contains these figures was compiled from custom house returns, and in the case of Detroit at least, shows only the tonnage which took its departure from the country at this point, which means tonnage sent direct into Canada, either for Canadian consumption or for re-export. It does not take into consideration the vast tonnage of Detroit and Michigan products which was sent by rail to American seaboard ports and thence to foreign markets.

According to the report, Detroit easily stands first among the 10 largest Great Lakes ports, both in exports and imports. The aggregates of exports and imports for the fiscal year were as follows:

| | |
|---|---|
| Detroit | $431,005,042 |
| Buffalo | 328,810,086 |
| Ogdensburg | 315,679,587 |
| Chicago | 74,354,910 |
| Duluth | 51,442,841 |
| Cleveland | 46,622,107 |
| Great Falls | 15,341,012 |
| Milwaukee | 4,771,854 |

Of the total exports and imports, given above as $431,005,042, exports amounted to $339,844,490, and imports amounted to $91,160,552.

A comparison of reports similar to the one summarized above for the preceding two years shows that exports from Detroit direct into Canada increased 41.76 per cent in 1919-20 over 1917-18.

# APPENDIX B

# STUDIES OF PROPOSED LAKE-AND-OCEAN TERMINAL

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Detroit and world-trade
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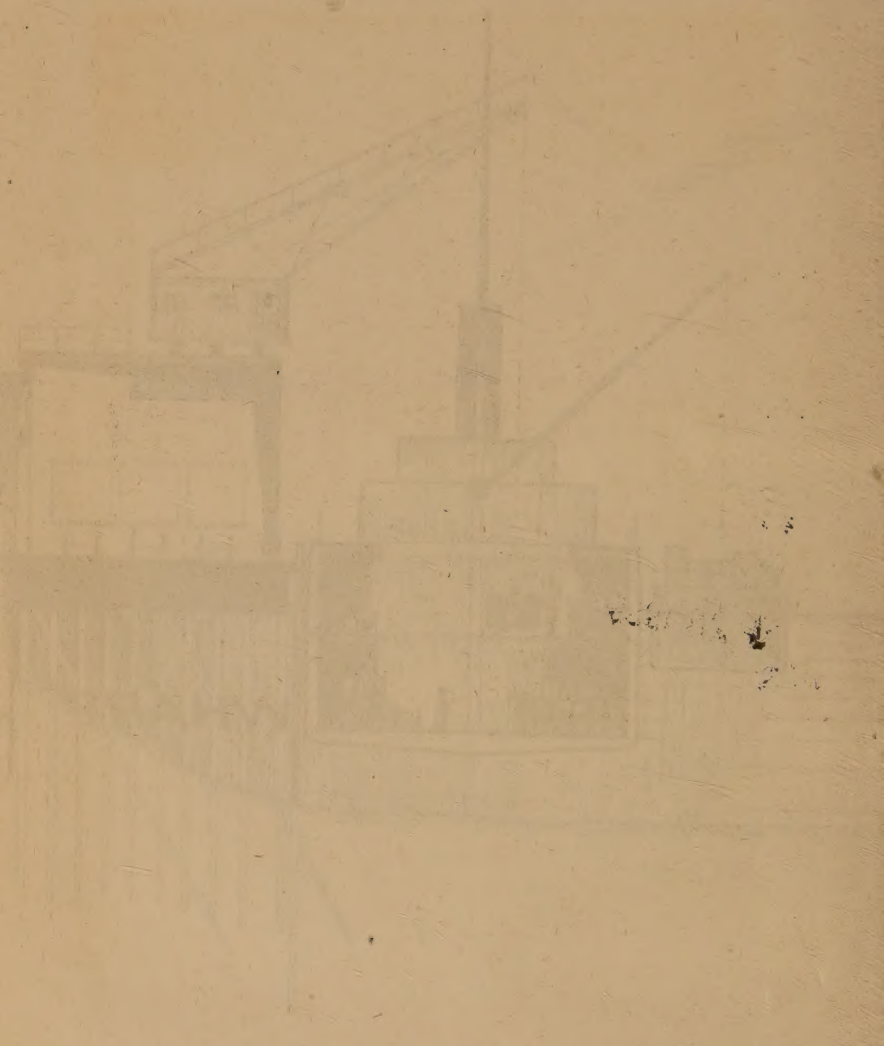

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